MALARIA NUMBER

VOLUME VIII MARCH, 1915 NUMBER 3

Southern Medical Journal

Journal of The Southern Medical Association

THE TRUTH AND THE TRUTH ONLY ON EVERY PAGE FROM COVER TO COVER

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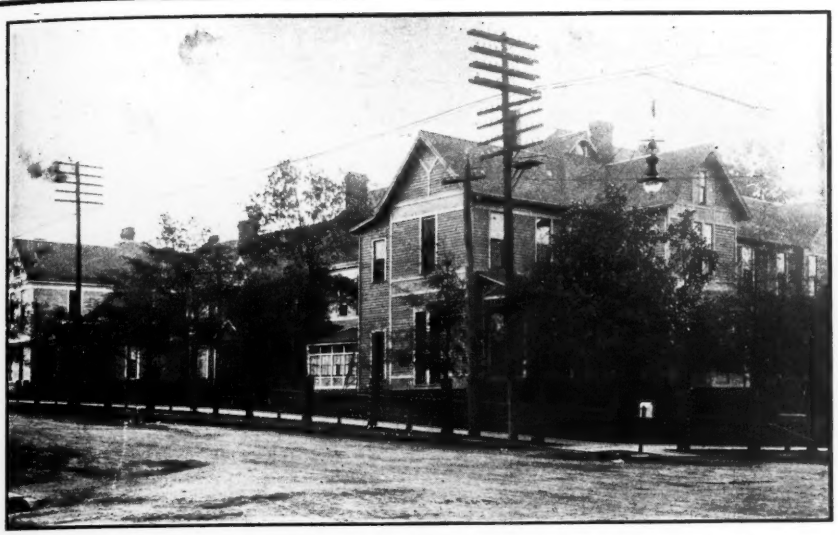

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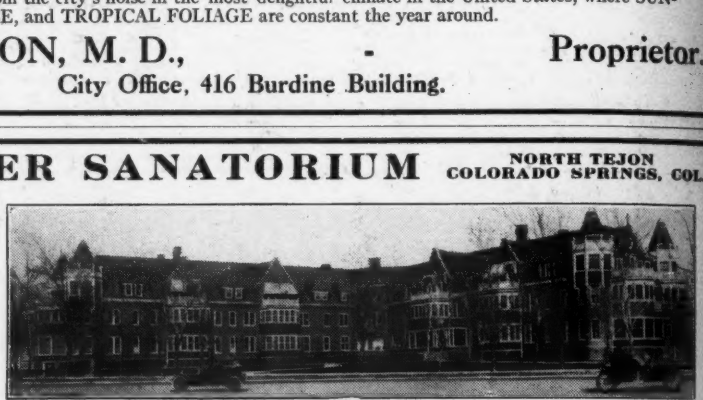

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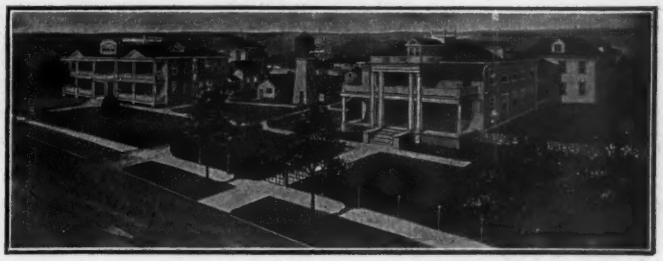

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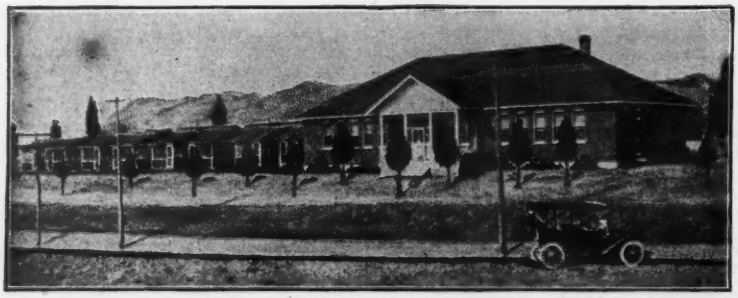

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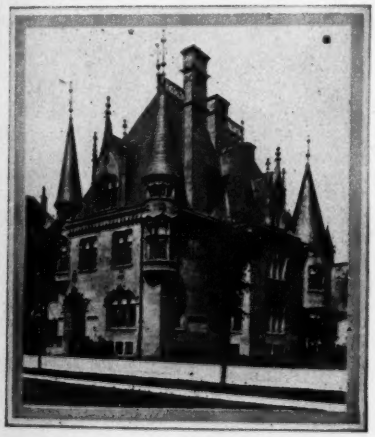

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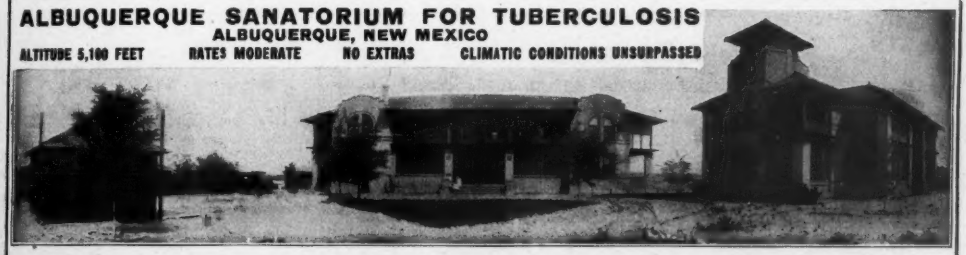

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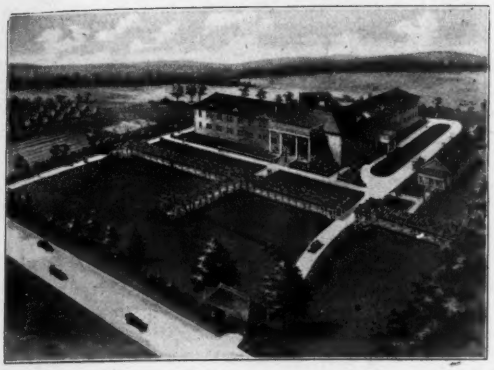

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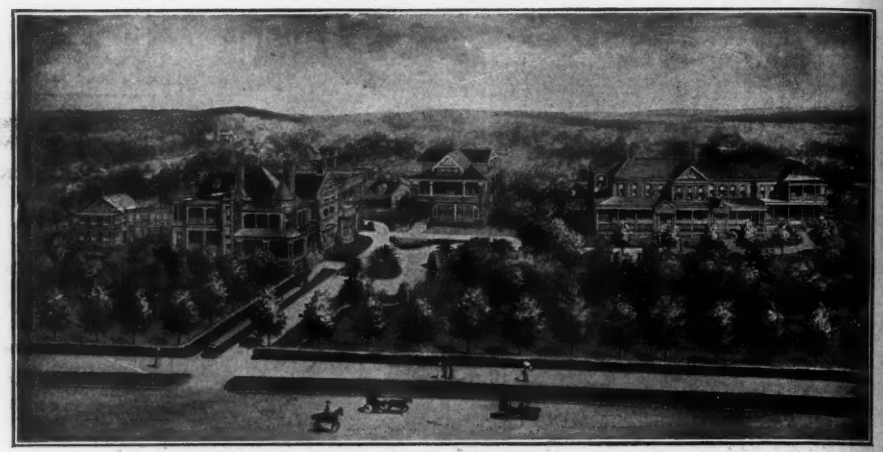

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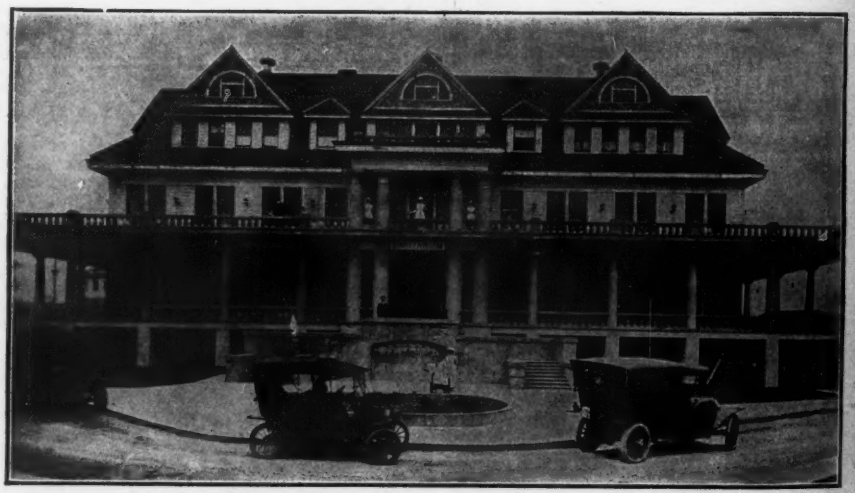

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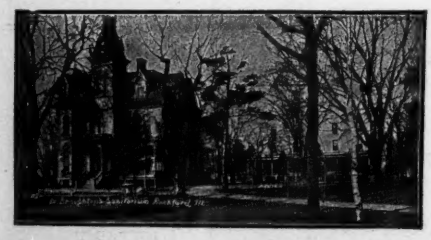

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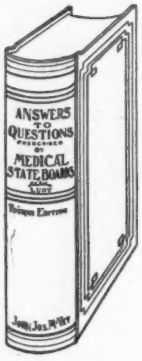

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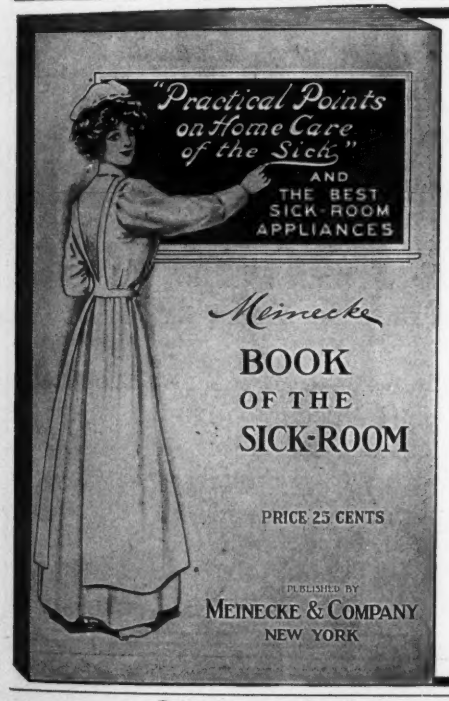

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Volume VIII | MARCH 1, 1915 | Number 3

TROPICAL DISEASES AND PUBLIC HEALTH

THE EFFECT OF IMPOUNDED WATER ON THE INCIDENCE OF MALARIA.*

By H. R. Carter, M.D.
Senior Surgeon, United States Public Health Service, Baltimore, Md.

Last fall a new problem was presented to me—the effect of large bodies of impounded water on the production of malaria. It was interesting, it was important and it was new. How interesting you will find my presentation of it I do not know. Of its importance there can be no question, as it is especially concerned with the large ponds of the power plants of the South; to which plants this country is looking for no little part of its future development. I was looking over a map of the Southern Electric Company and a reasonable estimate of the cost of the plants there given as in operation would exceed one hundred and fifty million of dollars, and as many more projected. Why, the plant at Whitney on the Pee Dee, is estimated at costing twenty-three millions itself. And it is fair to say that for every dollar's cost of these plants at least five dollars' worth of good is done in the development of the country. You see then how large are the interests involved. And the production of power plant water is not like getting it from coal. It is not the consumption of a national resource. It is the utilization of a waste power which does not lessen by use, a true conservation of a natural asset. If these plants, or rather the ponds of these plants, are a serious menace to the health of the community, either they must not be allowed, or can be allowed only by rendering unhealthful, or even uninhabitable, a considerable area adjacent to them. In either case the loss involved is a very serious one. And the problem is certainly new. Save the studies now under way I know of none on this subject. I am reasonably sure there are none.

So much for an introduction. The problem then is to determine what is the effect on the incidence of malaria of these large bodies of impounded water. The study should give the conditions about the pond which affect the incidence of malaria—making it more or making it less— and thence to the means to be taken to minimize the first result and to increase the latter to a maximum.

The ponds which we would consider are those of the large power plants in the eastern and southern slopes of the Southern Appalachians, situated in the uplands between the flat

*Read in Section on Medicine, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., November 9-12, 1914.

country and the mountains. Below this there is not enough fall to justify a dam. Above it is not in the malarial zone.

The general configuration of a river valley in this section—and I speak only of this section—is about as follows: On one side of the river is a cliff and on the other a flat—the "river bottom." The cliffs and flats alternate on the same side of the river, but in general face each other across the river. Rarely does a cliff face a cliff or a flat another flat for a considerable distance, although, of course, the river does sometimes run in a gorge or between flats.

The cliff comes down steeply to a plateau a few feet or yards wide on the bank of the river. The flat is highest just at the river bank and extends back to the hills. Skirting the base of the hills there is almost invariably a marsh, or marshy stream. Sometimes this is quite extensive, sometimes simply a series of small marshes fairly extensive in the aggregate. It is the seepage water from the hills. The flat is usually crossed in various directions by ditches and sluggish streams and not infrequently is marshy.

The river flows normally between fairly deep banks, say 4 to 8 feet below them, with occasionally a "false bank" on the sides next the flats. Into the river empty creeks, branches and ravines. When they come through a flat, or skirting between a flat and a hill, there are generally marshes on its banks, or on one bank, as it crosses the flat.

With such a valley, there are places physically suitable for breeding anopheles normally existing on every river bottom, especially at the bases of the surrounding hills, and in general such places do breed anopheles.

THE NORMAL POND.

When a dam is built for a power plant it is high enough to cause the waters near the dam to cover the flat and come well up on the hills back of it. The result at this place is a sheet of water filling the valley from the cliff on one side to the hills beyond the flat on the other, with deep water against steep banks on both sides. This obviously is not suitable for breeding mosquitoes and the covering up of the marshes and other places physically suitable for breeding mosquitoes on the flats, markedly lessens the number of such places near the dam. As we go up the river toward the head of "back water," on account of the gradual rise of the normal river bed and valley, there will be some place where the pond just overflows, or nearly overflows, the flats and produces physical conditions very suitable for breeding mosquitoes. Above this zone—the "Zone of Overflow"—the river is confined to its banks and its effect in breeding mosquitoes is not directly affected by the dam. Up to backwater, however, wherever the elevation of the river is high enough to fill the drains of the flats and thus lessen seepage, the flats will be less well drained. In this section too, it will back up into the creeks and branches entering it, giving fish better access to the lower portions of their beds.

Similarly, the mouths and lower portions of creeks and branches—which are normally quite frequently marshy—are, near the dam, covered deeply by water standing against the hill sides which form the sides of the valleys of these creeks. The mouths of these creeks then and the marshes on their banks are thus no longer physically suitable for breeding places. Yet, just as with the river, there should be—at least may be—zones of overflow for the creeks which produce physical conditions well suited for mosquito breeding. This is especially true of large creeks with considerable flats on their banks. Where the valley is narrow and the sides of the valley are steep this will not occur, or only to a small extent.

Obviously then, in normal stages of water the dam destroys some breeding places—near the dam especially—and makes others higher up the pond, and on some of the creeks entering the pond.

FRESHETS.

The ill effect of a rise in a river overflowing

its banks is that as it goes down to normal pools will be left on the banks to breed mosquitoes. When the normal river goes down after a freshet pools of water will be left on the low lands if the rise has been "out of banks," and these will be more or less persistent, according to the permeability of the soil. A much less rise will leave pools on the "false bank" and these, the top soil being scoured off, are more permanent.

For the pond, near the dam and wherever the waters of the pond rise against hill sides no pools would be left, and consequently no ill effects received from a freshet be it great or small. Above the zone where the pond is normally just out of banks—the "Zone of Overflow"—a freshet less than one that would normally cause an overflow, would now cause the banks to be flooded and on going down would leave pools. A full freshet would also overflow this part of the pond, but would do no more harm than if there were no pond. In the zone of overflow a freshet would do good, that is render it less suitable for breeding mosquitoes. Below this, in the pond proper, it would have little effect.

In the creeks entering the pond the rise, and hence backwater of the freshet would be extended higher than the same freshet would have gone in the normal creek and as the water goes down whatever effect would have been produced in the normal creek valley will be, more or less, produced at a higher elevation up the creek.

Obviously, the effect of a freshet is more or less proportionate to the amount of the rise. Now in proportion as the area of the pond exceeds that of the normal river it replaces, so much will the rise of the pond be less than that of the river, and the rise of the freshet in the creeks entering the pond would also be less, measured from their ordinary backwater, than it would have been measured from the level of the normal river had there been no dam. These rises determine the land overflowed by the freshet and consequently left bare by its subsidence, both for the creek and river valley. It would seem then, that the effect of the freshet would, on the whole, be lessened—and decidedly lessened—in that part of the valley covered by and adjacent to the pond.

GENERAL EFFECT OF DAM.

Whether the whole effect of the dam is to lessen or increase the breeding places, is a question which will have to be determined by biological study, and which doutless will differ for different ponds. This much is certain: *The impounding of water will change the location of places physically suited for breeding.* It will move them away from the dam towards the upper reaches of the pond. It will destroy them in the lower part of creeks which empty into the pond to, possibly, increase them higher up away from the river. A change of location of actual breeding places—the number of mosquitoes remaining the same—would *in general* be a disadvantage, because the locations of residences in a long settled malarial section have been determined to an extent by the healthfulness of the location—the more malarious situations being avoided.

It is assumed that anopheles mosquitoes do not breed in the deep open water of the pond and that only such conditions as affect the shallow water at the edges need be considered. This only needs stating.

I am not going into an enumeration of the conditions which affect the breeding of mosquitoes in the pond and its immediate environment. These are given in some detail in two papers shortly to be published by the Public Health Service. Suffice it to say that the factors of prime importance in preventing mosquito breeding are :

(1) Fish.
(2) Predatory insects, and
(3) Wave action.

And naturally the factors of prime importance favoring the breeding are:

(A) Protection against aquatic enemies, and
(B) Protection against wave action.

(1) The role of fish in destroying mosquito

larvae is too well known to discuss. A pond with large areas of shallow water and running up the beds of creeks is an ideal place for the propagation of little fish—much better than a normal river. And so we have found it. In the few ponds examined small fish have been in abundance on the edges of the water, especially where it was shoal, and about the mouths of creeks. They withdraw from a shore against which the waves are beating, and to some extent, I think, from the edges when the pond is very muddy—although it may be only that they are less visible then. In clear, shallow water, undisturbed by wave action they were congregated in shoals, and these are the places most suited for mosquito breeding. It is needless to say that where fish have access to larvae no larvae are found.

(2) Compared with fish the action of predatory insects in preventing mosquito breeding is probably small, but in one pond we found it a most useful adjuvant. In the zone of overflow, as the pond went down after a minor rise, a number of long pools were left in a meadow. These pools were shallow; with dead grass in them and on their banks, there were cattle convenient, and were such pools as we would have expected to breed anopheles. These were carefully examined three times in two weeks. Anopheles larvae were not found in them, but they were alive with a small insect known as "Water-boatmen" and stated by Jennings of the Bureau of Entomology to be Hemiptera, genus Corisa, family Corisidae and to feed on the larvae of mosquitoes.

"Whirligig-beetles," "Water Tigers," "Mellow-bugs," as they were known to me as a child—I think that they are Gyronidae—also feed on mosquito larvae, and that they were efficient in preventing breeding was evidenced by never finding larvae where any number of these insects were present.

These classes of insects, as well as fish, were far more abundant in the pond than in the river. The conditions for their increase were evidently favorable. They were especially prevalent up the bayous and about the creek mouths.

(3) It is not necessary to say anything about the effect of wave action in destroying larvae. A rather slight wave action is sufficient to drown the larvae—as one can try by attempting to carry them in a tin bucket. On the edges of the open pond and for some ways up the mouths of fair sized bayous, wave action is efficient in destroying larvae, and only those which are in sheltered nooks, or up tortuous channels, can escape. The spreading of the waves render them efficient on many shores not directly in the track of the wind, and indeed it is surprising how far they will travel up even tortuous channels. Naturally, the wind is not always blowing and hence wave action is not constant, but it will rarely happen that it intermits or blows only in one direction for so long a time as that required for the development of the mosquito from the egg.

(A) Protection against fish is given mainly, (1) by floatage, and (2) by grass growing in the pond. Of course if pools are left as the ponds fall with no fish in them this may also be counted as a protection against fish. Quite frequently fish are left in such ponds.

What I have seen makes me think that floatage protects against water-boatmen, and probably both floatage and grass against the beetles. I would not be too positive of this, however.

(1) By "floatage" is meant the small stuff, bark, little sticks, etc., which forms almost a scum on the water and lodges against the bank in little coves, or near the bank if it, the bank, be well sheltered by brush. Pine needles seem to form especially bad floatage. In this larvae are sheltered from fish. On Blewett's Falls Pond they were frequently found in this floatage where it was protected from wave action. Generally in small or moderate numbers, but occasionally—four times—in considerable number.

Once only were they found in this floatage under such conditions that we thought

that the eggs were deposited where the larvae were found. In other cases we felt reasonably sure that the larvae had been washed down to the place where found, and were hatched out elsewhere. Some few of them may have been hatched where found from eggs washed there but deposited elsewhere. It is perfectly possible for larvae so lodged in floatage to develop into imagos and at one, possibly two, places this occurred as was evidenced by finding pupae and pupashells. Ordinary drift wood in large pieces seemed to furnish very little protection against fish—about none except when algae was growing on the pieces.

The two factors which militate against this protection from fish given by floatage are wave action and change of level of the pond. The first wherever it can reach the drift drives it ashore, and if strong enough up on the shore, where naturally it ceases to be "floatage." Incidentally it drowns all the larvae in it.

The change of level of the pond, since it is the tendency of the drift to hug the shore, leaves the floatage stranded high and dry as the water goes down. This is especially true of flat banks—much less so where the bank is steep. In the first a vertical fall of a foot would uncover—say 5 or 10 feet of bank and easily strand all of the floatage. On the second much less bank would be uncovered and less floatage stranded. The presence of dense brush in the pond near the bank will also keep a certain amount of floatage away from the shore and prevent its stranding when the water falls. In only a very few places did we find this much of a factor—the floatage naturally seeks the bank—"All drift comes ashore at last," is a proverb on the seashore.

It is well maybe to say something more here about the change of level of the pond. In the section considered the power which these ponds supply is largely used for cotton mills, and on this acount the power plant is partly shut down from Saturday noon to Monday morning, and the water rises in the pond during this time. The rise at Blewett's Falls was from 2′ to 5 1-2′ during the Sundays I was there—more when the pond was low. In addition there is a smaller daily rise and fall—due to shutting down at night—of about 12″ to 18″. In addition to the stranding of the drift, it is easy to see that change of level of the water should work to the disadvantage of the larvae as it would produce a change from the protective conditions which they themselves had established. A vertical fall of one foot would uncover more than one foot horizontally—from 10′ to 20′ on sloping banks—a movement greater than the larvae might be able to protect themselves against during the time of rise and fall.

(2) That grass and thick vegetation generally furnishes protection against fish is well known. Anopheles larvae were found in numbers in land grass (bermuda), at one place in the Parr Shoals pond. The place was so recently overflowed that the grass was not dead and the water was clear. The examination of this pond was superficial, but of probably ten or a dozen places in which banks covered with grass and weeds were examined this was the only place in which larvae were found; fish taking care of the remainder. This place was inaccessible to fish and doubtless was not the only one. At Blewett's Falls we did not find that vegetation was much of a direct factor in protecting against fish. The pond was in its third year; the land vegetation in the pond area was dead; the grass and weeds gone and there was no aquatic growth. In places recently overflowed where the grass was not gone, it was dead and covered with silt. No larvae were ever found in water containing this silt covered grass. It is reasonable to believe that aquatic grasses will grow in the shallow parts of the permanent ponds and, if so, they should give protection to larvae from fish. Examination of old ponds will throw light on this.

I was surprised to find algae playing so small a part in the protection of larvae as was the case in the few ponds we examined. At

Parr Shoals it seemed to be something of a factor, but rather as "floatage" than live algae. At Blewett's, where a careful examination was made, it was of practically no importance. Indeed, very little algae was seen about the pond, possibly on account of the extreme muddiness of the water. I will be surprised if examinations of other ponds do not show the growth of algae as a matter of moment in opposing the action of our best friend—the fish.

(B) Protection against wave action depends on location and shape of banks and bottom. On the banks of the pond proper and about the mouths of the larger bayous and for some distance up there is no protection when the wind is in the proper direction. An absolutely lee shore, of course, is not affected. Floating drift gives little protection, and standing brush, unless thick, not much. The shores of long, tortuous channels and places with banks or shoals to the windward are protected from wave action. A portion of the pond is then always protected against them—although not always the same portion.

Aquatic grasses growing in the pond would also break the force of the waves and protect against wave action; the extent of the protection depending on the thickness and extent of their growth.

SURVEYS REQUIRED.

Since we wish to determine the whole effect of the pond on the production of malaria we must compare the condition which existed before the pond was made with that which exists afterwards. If the malaria which the pond produces be counted a debit the malaria it prevents must be counted a credit. It is the *change* in conditions we would know.

Obviously then, a survey should be made of the country to be covered and affected by the pond before the pond is made. There is no other way to certainly get the normal condition of this country before the pond is made.

Unfortunately, for the ponds now existing this has not been done, and the method adopted at Blewett's Falls to determine this is probably the best that can be devised when the pond is already in existence. A section of the river valley was selected beginning a half mile below the dam and running about a mile down the river. A similar section was taken above "back water," both sides of the river. Both of these were carefully surveyed physically and biologically. It seemed fair to consider the submerged valley as being approximately like these sections. In addition when the bayous formed by the creeks and branches running down into the pond were surveyed, the examination was carried some distance above "back water," so as to see what was the normal condition of the country unaffected by the pond. For creeks coming in some miles up the pond this would be the class of country covered by the pond in creek valleys entering nearer the dam. To illustrate: If the dam raised the water 30′ and the pond was eight miles long the valley of a creek entering the pond at the dam would have been flooded 30′ above the normal river at the creek's mouth. While the valley of a creek entering four miles above the dam would be flooded only 15′, more or less, above this creek's mouth in the normal river. Thus the valley of the second creek from its back water to a contour 15′ above the pond level would correspond to a part—the upper part— of the valley of the first creek which was flooded. If the creek were 6 miles above the dam, from back water to a contour 22 1-2′ above it would be taken. In this way a pretty fair idea of the original condition of the submerged tract was obtained, but, of course, it was less accurate than that which would have been given by a survey of the tract itself before the dam was built.

In making these surveys—both of the normal river valley and of the pond, but for the latter especially, *the ultimate object is to determine for a given place whether it is producing malaria or not.*

It is not simply a question of producing anopheles. To produce malaria requires not

only mosquitoes—malaria-vectors—but people accessible to them, i. e. living within their distance of flight.

This is the crux of matter for that place. The two factors which ultimately determine this at a given time are:

(1) The production of anopheles, malaria-vectors, at such a place, and

(2) The distance of the place from residences occupied by men.

In the first the quantity of mosquitoes produced must also be considered—whether it is enough to be of sanitary importance—and also whether the conditions are such that it will be a more or less permanent breeding place or merely a temporay one.

In the second the obstructions between the place and the residences, hills, woods, etc., are to be considered as well as the distance.

I am not going into the methods of making these surveys—they will be given in another paper—except to say that the survey of the pond should be made more than once, at different stages and conditions of water; at different seasons of the year and, if the pond is a new one, for *several years* during the first few years of its existence, until the changes, physical and biological, caused by the formation of the pond have adjusted themselves.

I must, however, beg you to note that not every place in which one finds anopheles larvae is breeding—i. e. producing—anopheles. One must draw a distinction between a complete and an incomplete breeding place. In the first the eggs are deposited and ultimately devolp *at that place* into imagos. In the second something short of this takes place. For instance, in a pond at Hartsville quite a number of anopheles larvae were found, none over 3 or 4 days old and mainly just hatched. This was found to be the case at three examinations. and 60 days apart. Obviously eggs were deposited and larvae hatched, but they did not reach maturity. The fish ate them. At Blewett's Falls pond on the side of a fairly steep bank, the day after a heavy rain, quite a number of larvae were found in floatage. None were found two days later. They were probably washed down a creek entering the river just above and were drowned by wave action in the larger body of water. In the bayou of Jenkin's branch in the same pond, a large number of larvae (enough to have constituted a breeding place in a sanitary sense), were found in floatage in a nook sheltered from wave action. They were very evidently washed out of a marsh just at the head of the bayou about 24 to 36 hours before. A visit to the place two days later showed none and the shore swarming with fish. In the bayou of Barn branch, near its head, in the same pond, a considerable number of anopheles larvae were found in the floatage. The larvae were adults; some pupae and some few pupa shells. No small larvae. The creek which impinged against this shore was breeding profusely all sizes. As there had been a freshet in this creek eight days before it was fair to conclude that these larvae, with possibly the eggs from which some of them sprung, were washed down this creek at this time; lodged with the floatage and lived long enough to develop into imagos. In the first of the instances quoted the eggs were deposited at the place the larvae were found, but they—the larvae—did not live long enough to undergo full development. In the next two the eggs were not deposited where the larvae were found and the larvae did not develop into imagos. In the fourth the eggs were not deposited where the larvae were found, and yet the latter did develop into imagos. All these are instances of incomplete breeding places which should be common about ponds.

These things are simply mentioned to show that no rule of thumb can be applied, but that a certain amount of common sense must be used in giving different places, even where larvae are found, their proper value as breeding places of anopheles and as producing malaria.

There is little to be said of the distance of

the place from the dwellings of men. One gets it from a map or roughly by estimate. It seems reasonable to take in physical obstructions, as a wooded hill, between a breeding place and a residence as increasing the difficulty of success, but I have no direct data on this subject. It may be too, that the presence of brush, etc., between the breeding place and residence may, by furnishing shelters to the mosquitoes, increase accessibility to them.

This is not the place to discuss the distance between a breeding place and a residence beyond which malaria will not be induced, except to say that for the same species of anopheles, it will depend on the productivity of the breeding place; on the number of people in the residences in question, and on the accessibility of other sources of blood supply. I mean that a place producing a large number of anopheles will be apt to be dangerous further than one producing a smaller number of the same species; that from the same breeding place mosquitoes would be apt to go further to a village than to an isolated house; that they would be less apt to go far if they had a sufficient blood supply—stock or people—close at hand. As Sir Ronald Ross would express it: This distance would vary as a function of the productivity of the breeding place, by a function of the population in question, by a function of the accessibility of other blood supply. With the first two directly and with the last one inversely.

Roughly I have taken, from ordinary breeding places and under ordinary conditions, over a quarter of a mile as reasonably safe and over a half mile as safe. This is in accordance with the conservative opinion of tropical sanitarians, (and the last is in excess of what my own experience would require.) It is to be noted that the great flights of anopheles, as at Gatum and Stuttgardt, were from places breeding enormously and attracted by considerable villages, at Gatum of from 8,000 to 10,000 people, with no other blood supply accessible. Also that this Gatum flight *did not induce malaria*. Apparently the mosquitoes made the long flight to get the blood necessary for oviposition; returned to the breeding place to deposit their eggs before they became infective and stayed there. Still the two cardinal facts to determine for any place are: (1). Is it producing anopheles, and (2), is it close enough to residences to produce malaria. On these our findings must rest.

What are our findings? No general findings are yet possible. The work is just begun. Before these can be formulated much more work is needed; on a number of ponds under different environments, especially on ponds which have been in existence some years and have become—so to speak—settled; for the condition of the pond as regards mosquito production will certainly change during the first years of its existence. Even then while I am sure it will be found that there are certain principles applying to the general problem and certain general measures available to minimize any unsanitary conditions which they may cause, yet each pond will be, more or less, a problem to itself, the key to which will be given to a great extent by the survey made of the valley before the pond comes in existence.

Of the one pond which we have studied—that at Blewett's Falls—our findings for the past summer, (July and September), are as follows:

(1) That this pond has enormously diminished the area of breeding places of anopheles.

(2) That much, indeed most, of the area thus destroyed was close to the river and not close enough to residences to have conveyed malaria. Yet in some places, notably in the bayous and back waters of creeks, breeding places close enough to residences to have induced malaria were destroyed.

(3) That during our examination—the last half of July and the last half of September—we did not find any breeding of sanitary importance in the zone of the overflow.

Whether this was an accident of this summer or not may be a question. It was apparently

due to the presence of swarms of "water-boatmen" and small fish. The physical conditions were, part of the time, suitable for breeding anopheles.

(4) That the zones of overflow in the creeks were not found to be breeding, much less so, indeed, than the upper part of the creeks themselves, well above backwater. This was due to the number of fish which were present in these places, and indeed destroyed such larvae as were washed down the creek in a freshet.

(5) That mosquito larvae washed down from creeks, etc., lodged in the floatage of small stuff, which drifts ashore in the pond and may undergo full development there. Outside of the zone of overflow this was the only place in the pond where mosquito production could take place. This was most marked during the survey in July—16 to 30—when the water was high. In low water this was not found to be the case.

(6) That wave action quickly destroyed the larvae in such floatage as it reached.

(7) That the only part of the pond in which this floatage contained larvae over a few days, was in the bayous of creeks and branches, so far from the mouth of the bayou as to be protected from wave action. In one place in considerable number; in two others a fair number, but generally scattered, one or two or three in a nook.

(8) That the change of level of the pond is an efficient deterrent to mosquito production; the fall of the pond leaving much floatage stranded and rendering larvae more accessible to fish.

(9) That below the zone of overflow the pond when low, as in September last, was ill suited for producing mosquitoes and was not producing them. This was due to (1) the naked banks—all floatage being stranded ashore—and, (2) to the number of fish and predaceous insects on the banks, and especially, in shallows and in the backwater of creeks. The conditions for producing anopheles were thus decidedly less favorable—I mean would produce fewer anopheles—when the pond was low than when it was high.

It is understood that these findings apply strictly to this pond, for the last summer, when we saw it, not when it was first formed nor to it in the future, nor except in a general way to other ponds.

CONCLUSION.

Obviously the only parts of the pond that can induce malaria are those parts that produce anopheles sufficient for sanitary consideration and are within, say a half mile of a residence. From the data of this paper the first condition—the production of anopheles—can generally be expected to obtain only, (1) in the zone of overflow, and (2), on the banks of the bayous of affluents protected from wave action against which floatage lodges.

Even with the small amount of investigation that has been made, the following suggestion, for obviating the lodging and floatage seems justified:

First, lay out the contour of the pond and mark all portions of it within, say one-half a mile of dwelling house. Wherever any such contour will form the shore of a bayou of the pond not subject to wave action, cut the brush from this contour down to well below the contour of low water of the pond, so that there will be nothing to keep the floatage from going ashore and being left there as the water falls. This should not generally be an expensive proposition and will avoid the production of some anopheles where they might do harm.

It would be an added precaution if trees and brush were cut out of the pond area, as this would diminish the amount of drift and floatage. This may not be economically advisable as it might be quite costly, and I think, would not materially affect the amount of the drift.

It might be advisable to do the clearing of brush indicated at all places where the high contour comes within the half mile of a residence. We would thus be independent of

wave action. This scarcely seems necessary, however, as in general the wave action is dependable.

As floatage is little apt to be a problem in the zone of overflow these measures are not applicable there. Here it would be advisable that the banks be so arranged with ditches and drains that, so far as practicable, no water in pools be left between the contours of high and low water. In general this could be accomplished only very partially. Yet such action is all that I am prepared to recommend at present for this zone.

I think that clearing the contours not subject to wave action, as indicated above, should be *required* of one making a pond—possibly using the radius of one-fourth instead of one-half a mile. This to be a minimum requirement.

Possibly for some ponds it may be necessary to require that the banks within the radius of flight be not only clean and draining free from pools, but steep between high and low water. This we think would be a maximum requirement, and would generally be efficient against the production of anopheles. About portions of some ponds, as at the zone of overflow, this would be economically impracticable. It would be cheaper to purchase the land, or rather to extinguish the right of residence on it, within this distance of the natural bank.

A DISCUSSION OF MALARIA CARRIERS AND THE IMPORTANT ROLE THEY PLAY IN THE PERSISTENCE AND SPREAD OF MALARIA.*

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This short paper is presented for the purpose of emphasizing the part played, especially in the spread of malaria to other persons, by persons not supposed to have the disease as well as those known to be infected. It can be stated that the general opinion is that people ill of malaria are the chief source of the disease to others. As a matter of fact, they are quite a minor factor in the spread of the disease. Persons who are not ill and have not been ill of malaria are the chief malaria carriers. It is a fact, however, that persons who have recovered from an attack of malaria frequently remain carriers for many months or perhaps years.

A person infected with malaria plasmodia may have in his blood the asexual form of the parasite only, he may have both the asexual and sexual forms in varying proportions and in varying numbers; finally, he may have for a short time, at least, sexual plasmodia only.

Reproduction of asexual plasmodia by schizogony is responsible for the clinical symptoms of malaria, such as chills and fever. Sexual parasites do not produce clinical symptoms. In one instance, by centrifuging the defibrinated blood drawn from a patient we were able to collect a measurable quantity of pure crescents free from blood cells (except those attached to the individual crescents). The quantity obtained was approximately 1-160th of the quantity of blood from which they were recovered, or one c. c. from one hundred and sixty c. c. At this rate the entire blood of an average size man would contain about thirty-five c. c. of pure crescents. In spite of this large number of crescents, the patient was up and about the ward and anxious to be discharged. He had not had fever since eight days previously. Asexual plasmodia were demonstrable during the attack of fever. Malarial chills and fever never occur when sexual plasmodia, gametes, only are present.

When an individal is infected with malaria plasmodia the parasites reproduce by an asexual process segmentation or schizogony if conditions are sufficiently favorable. After a sufficient length of time they have multiplied until the number present or the toxin produced is

*Read in Section on Medicine, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., November 9-12, 1914.

sufficient to cause clinical symptoms. With each paroxysm the number increases, unless some influence is brought to bear which interferes. Though there may finally be enough plasmodia to destroy the patient, it is remarkable the large number of parasites that may sometimes be present, and still the patient recovers as a result of treatment. If we estimate the amount of malaria plasmodia in some of these cases we must conclude that it is comparatively a non-toxic organism after all. A case that recently came to my attention had an average of one parasite to every two and one-fourth red cells in his peripheral circulation. Assuming that the volume of each mature schizont is as great as that of a red blood cell (and it is actually considerably greater), this patient would have had by the end of forty-eight hours approximately three pints of malaria plasmodia. As a result of prompt quinine treatment he was living at the end of forty-eight hours with fair prospect of recovery, and had only an occasional sickly looking parasite in his peripheral blood. I have known several cases to recover when every fifth to tenth red blood cell contained parasites, and there were as much as from half a pint to a pint of plasmodia produced every forty-eight hours.

Conditions in the body of the patient may be so favorable as to permit the production of this very large number of plasmodia, or less favorable when only a much smaller number of parasites are produced and only ordinary clinical symptoms result, or they may be still less favorable when not sufficient asexual reproduction occurs to produce clinical symptoms. Whenever this point is reached the species is in danger of being destroyed so far as this patient is concerned, and nature's more resistant form, the gamete, is produced. This form is capable of living a long time under unfavorable conditions and of reproducing under unfavorable conditions in anophelines, and possibly in the body of man.

Small doses of quinine will cause the production of gametes in most patients, and insufficient treatment with quinine, chill tonics, etc., is a very fruitful source of malaria carriers. They are the carriers for which the doctor is often responsible. There is, however, a much larger number of carriers who possess enough resistance (whatever that means) to prevent sufficient asexual reproduction to produce clinical symptoms, and in whom some gametes are produced for long periods of time. If such individuals should have their general vitality greatly lowered they may then have clinical malaria, otherwise they remain well. The large proportion of these carriers present in a community where clinical malaria prevails has been emphasized by malaria index work. It is often found that there are three to five or more times as many people who have plasmodia in their blood, in a community, as there are who are ill or have been ill with malaria. The carriers are not sick and will not get sick unless special conditions favoring development of malaria plasmodia in them should arise.

Just what this immunity consists of is not well understood, but it is probable that it can best be acquired during early childhood.

Immunity to a very similar disease to malaria, viz., cattle tick fever, is acquired as a result of infection during early life. The piroplasma is a red blood cell parasite like the malaria plasmodia, and reproduces in a very similar manner. Calves infected during the first few months of their life seldom get sick at all, but remain immune from fatal tick fever during the remainder of their life. As long as they remain in tick infested territory they are carriers and capable of infecting ticks, but if they are removed from all source of reinfection they cease to be carriers after a few months.

It is these unsuspected malaria carriers that I would call attention to especially. For every clinical case of malaria there are several of these carriers. We may, therefore, not be surprised to see a case of malaria which we have cured relapse, as we think, when there are several carriers perhaps in the very house he

lives in, members of his own family, infecting mosquitoes, which in turn may reinfect the patient at any time.

The ideal way to deal with the situation would be to thoroughly examine the blood of all persons in the house and treat the carriers. This will not be practical in most instances, and the next best thing would be to consider all members of the household probable carriers and treat them as carriers. Such measures carried out during the cold season are more successful because mosquitoes are not active carriers at that time.

THE LOSSES TO RURAL INDUSTRIES THROUGH MOSQUITOES THAT CONVEY MALARIA*

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The title on the program implies that the Bureau of Entomology of the United States Department of Agriculture is prepared to offer to this symposium a definite plan for a campaign against malaria. We have, however, for your consideration only the plan of an investigation on our part, the objects of which are the determination of the losses to rural industries caused by the mosquitoes that convey the disease malaria; the regional distribution of these mosquitoes as to species, and exact information on the biology of the various species of malarial mosquitoes under the peculiar environmental conditions which obtain in those agricultural regions where malaria is prevalent. We believe that the results of such investigation will place the effort of malarial reduction in farming regions on an economic basis.

The disease malaria is essentially rural for the reason that the mosquitoes which convey malaria are essentially rural species. The reduction of malaria will benefit the farming class more than any other class, and the control of the disease is distinctly an agricultural problem. The serious loss to agriculture from malaria is not in the expenses of treatment or in death, which rate is low, but in the reduced crop returns and the lessened net profit from the farm from loss of time and reduced efficiency of labor; in the non-development of large areas of fertile land, and in the predisposition of the disease to other more fatal diseases.

Certain facts which concern the biology of the malarial mosquitoes explain the rural nature of the disease which they convey. While the mosquitoes which have been incriminated as the conveyors of malaria are domestic in respect to certain adult habits—that is, they frequent human habitations for purposes of feeding and of obtaining shelter, they are only partially domestic in their breeding habits. Natural collections of surface water are more often selected as breeding places. The larvae of *Anopheles* thrive in water best illustrated by the shallow margins of swamps, ponds and slow moving streams, grass-grown springs and land-locked pools. Water areas of this character are common to rural and not to urban districts. The abundance of *Anopheles* in any region is in direct proportion to the extent of such collections of water. In this respect the *Anopheles* are in contrast to the yellow fever conveying mosquito, *Aedes calopus*, the *Stegomyia* of earlier literature. The yellow fever mosquito is thoroughly domesticated as regards both larval and adult habits, and the disease it conveys is a disease of towns and cities. Yellow fever invades the rural districts from the more densely populated centers, in contrast to malaria which invades the towns from rural districts, or, if it is not of rural origin, the towns or their immediate environs supply the peculiar requirements as to the breeding places. The rural origin of malaria is demonstrated by the disappearance of the disease in certain regions where large

*Read in Section on Medicine, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., November 9-12, 1914.

areas of land have been drained and brought under cultivation—that is, malaria has decreased in proportion to the decrease in the natural collections of surface water.

Since malarial reduction is in direct ratio to decrease in the areas of surface water in which the larvae of malarial mosquitoes thrive, the problem of malarial reduction is biological in scope.

It is necessary to modify the statement respecting the rural origin of malaria. While generally true, the rule does not hold in all instances. Dr. Howard, in 1910[1], after pointing out the general disappearance of the disease in the United States in the great agricultural Middle Western States of Ohio, Indiana, Illinois, Michigan and Wisconsin, "where malaria played such great havoc during their settlement through more than the first half of the nineteenth century," and where "swamp reclamation as a whole has been carried out on the largest scale," goes on to discuss the increase of malaria due to civilization. Instances are cited by Dr. Howard where the advance of civilization has been directly responsible not only for the increase of malaria in some sections but for the introduction (in some instances re-introduction) of the disease in places where it was not endemic. The examples given refer to irrigation projects, to the impounding of water for commercial purposes, to excavations for quarries, for construction of buildings, of railroads, etc., and to the interception of the flow of small streams by embankments.

The prevention of malaria and the treatment of the disease are two distinct problems. The former is biological in scope, while the latter is a medical problem. The treatment of the disease over long periods in malarial regions has not reduced the malarial rate in those regions except where prophylactic measures have been employed for protection from attack by the malarial mosquitoes, or measures taken to reduce the malarial mosquitoes in numbers. The disease is well understood and treated by the physician. The physician also urges his patients to screen their dwellings, to use bars against the adult mosquitoes, and to prevent the breeding of mosquitoes in and around their properties. Here the responsibility of the physician ceases. The fact that malaria continues, then, is due not to the treatment of the disease, but to lack of control of the mosquitoes that convey it. The present efforts of malarial prevention in this country are based on insufficient data concerning the biology of the mosquitoes that transmit the disease. Practicing physicians in rural districts are free to admit that while they can administer the treatment for malaria successfully they cannot advise definite preventive measures that meet in a practical manner the peculiar conditions that confront them in their particular zones of practice. It is a fact that the prophylactic measures are too general to be standardized. Malaria is a rural disease, but its exact relations to agriculture and to agricultural development are not known. Because of the lack of definite information on the agricultural and biological phases of the problem of malaria in this country this investigation was undertaken by the Department of Agriculture last season.

The work of the Bureau of Entomology of the Department of Agriculture upon mosquitoes dates back for a quarter of a century. The investigations were in progress before any species had been incriminated as the conveyor of any disease. This early work was justified by the irritation and discomfort to people and the annoyance to domestic animals caused by these insects. The studies on the development and habits, on the classification and distribution, and on measures for protection from mosquitoes or their repression formed the basis of the mosquito control work in this country. When it was demonstrated that certain mosquitoes are the intermediate hosts of the disease-producing organisms of malaria and yellow fever, the Bureau of Entomology undertook at once a special study of the spe-

1. Atti Soc. per gli Studi della Malaria, Vol II, 1910, pp. 67-73.

cies of mosquitoes suspected of being the vectors. The systematic work of the Bureau made it possible to identify the particular species involved in the disease transmission. The general information on the prevention of these diseases is based on the results of the biological work of the Bureau on the species of mosquitoes incriminated. To emphasize the need of further biological work on malarial mosquitoes reference will be made to two authorities high in the medical profession. Dr. Samuel T. Darling,[2] Chief of the Laboratory of the Board of Health of the Panama Canal Zone, is quoted as stating that "each region and each locality must be studied by itself, even though the region contains *Anopheles,* the bionomics of which for other regions are well known."

Maj. S. J. James,[3] of the British Indian Medical Service, speaking of the work of mosquito repression in Colombo, states that "in regard to the mosquito problem it is sometimes taught that the period when all efforts should be concentrated upon obtaining 'practical results' is already overdue. But I believe it will be clear from the foregoing summary, and still more from the details recounted in our full report, that during our period of inquiry we have been able to do no more than cover the border of a wide and difficult subject, and that the primary need of Colombo (and, indeed, of the Colony generally) is further investigations."

If we take a map of the United States and indicate the location of the swamp and undrained lands and the lands subject to overflow, we find that we have also indicated first, regions known to be malarial; second, areas included in the distribution of one or more species of the mosquitoes that convey malaria; third, the most fertile lands of the United States; and fourth, the lands which, though offering the most in crop returns, are less developed than any agricultural regions of similar extent in the United States. We note also that the larger portion of these areas lie within the Southern States. Add to this greater extent of surface water the longer season of high temperature favoring mosquito development and we have the explanation why malaria is more prevalent in the South than in other portions of the United States. There are 79,000,000 acres of swamp lands and lands subject to overflow in the United States, the bulk of which is agricultural land of the greatest potential productiveness.[4] 55,000,000 acres of this land are located within the Southern States and 24,000,000 are in the lower Mississippi valley. The above figures do not take into account the 150,000,000 acres of land in the United States not classed as swamp land and not subject to overflow, but which are in need of drainage. The larger portion of this immense area also lies within the boundaries of the Southern States.

This investigation was outlined by the Bureau of Entomology as an intensive study of malarial conditions on a plantation in the South, located in a region where malaria is prevalent. A location was sought where the minimum of conflicting factors would be met, but which at the same time would offer typical conditions as regards agricultural operations and endemic malaria. Especially favorable conditions were found on an estate in the Delta region of the Mississippi Valley. This region is favored by the almost total absence of hookworm, typhoid and pellagra, all factors which, if present, would interfere with a study of the loss of time from malaria. The soil is highly productive, thus eliminating the factor of unproductiveness of soil in figuring crop returns. The management of the estate is efficient and progressive and the crop returns are therefore maximum under the conditions that obtain, thus preventing the error of charging to malaria the losses due to inefficiency of management. The environmental conditions under

2. Ludlow. Bul. 4, Office of the Surgeon-General, War Department, 1914, p. 95.
3. Indian Jour. Med. Research. II, 1914, p. 256.
4. Senate Doc. No. 443, Sixtieth Congress, first session.

which the work is being carried out will be demonstrated by the lantern slides made from photographs taken during the course of this season's work.

The estate on which this intensive study is being conducted is outlined on the accompanying map, which shows the cultivated and timber lands, the water courses, and the locations of all plantation buildings. The estate fronts on the Mississippi River to the northeast at a point about ten miles above Delta Point, Louisiana, which is directly opposite Vicksburg, Mississippi. A bayou extends along nearly the entire eastern border of the plantation with a cross-bayou running west separating the northern portion of the estate from the main portion. Another bayou segregates the southeast quarter of the plantation while the main line of the Queen & Crescent Railroad system halves the plantation east and west.

The soil is of two classes, the "sandy" and the "buckshot," the former comprising the "front" or higher lands, that is, those lands lying along the river and bayous and the latter being the "back" lands, or those lying toward the timber and the swamps. The proportion of open sandy to open buckshot land is about the same, but as more land is cleared and drained the proportion of buckshot will be increased. The lighter sandy lands along the higher portions of the estate are susceptible to a certain amount of drainage under present conditions. It is therefore the land more easily worked. The buckshot land is a black, heavy soil, and the high water table offers little chance for drainage. It cannot, therefore, be worked to advantage during wet seasons. It is a strong, rich soil, and, if drained, would be a heavy producer. The subsoil is of the buckshot type and is quite impervious to water, that is, the collections of surface water are retained until eliminated by evaporation. The exception is the front lands restricted to strips along the river and bayous where a certain amount of both surface and under drainage is possible. For the most part surface water is retained a comparatively long time, especially on back lands and adjoining wooded areas, thus permitting mosquito development under favorable temperature conditions during the seasons of rain.

In common with all lands of this region the higher lands are near the river and fall away to the bayous, the bayous draining into the swamps. The lowest levels in this immediate region are represented by various shallow lakes of a more or less permanent character, located to the west and southwest of the estate. The bayous mentioned contain water the entire year, the amount decreasing during prolonged dry seasons, during which times the water is restricted to the lower places. Connecting with the bayous are several cross-bayous and independent of the bayous are various depressions termed sloughs. Both are often termed "wet-weather" bayous or sloughs, as the case may be, and this term well describes their nature as to the permanence of water in them. The term timber land is practically synonymous with swamp land in this region. The surface water in the wooded areas is greatly reduced and at times entirely eliminated by a dry spell of any extended duration. The artificial barrow-pits along the levee and the railroad complete the list of the important collections of surface water in this region under normal conditions. During periods of overflow the usual conditions of high-water prevail, but do not persist for any great length of time after the river regains its banks.

The work of this investigation is divided into five main lines, namely, survey work, climatological observations, biological work, pathological work, and experimental control work. The survey work includes a census of the people living on the plantation, the members of the families, their occupation and habits, the amount of land per family, the crops grown, the factors other than malaria that limit crop production, the seasonal loss of time from malaria and the effect of this loss of time upon crop returns. The survey deals also with the location of the fields under cultivation, the location of the houses in respect to

distance from woods, swamps, river, bayous, barrow pits, etc., and the general environmental conditions. Under the survey work are included also the collection and determination of the mosquitoes that frequent the houses; the seasonal density of the malarial species; the location of their breeding places in relation to the location of the houses; the classification of the areas of surface water as regards their seasonal, temporary, or permanent character; the capacity of these breeding places for mosquito production; the presence or absence of natural checks to mosquito development, as, for example, fish, predaceous aquatic insects, etc., and the presence or absence of natural protective agencies, as vegetation, trash, etc. Copies of the form used in the survey are available for distribution to those who are interested.

The climatological observations include records of rainfall, temperature, humidity, wind velocity, and wind direction. The records on rainfall and temperature permit a comparison to be made between these factors and the density of malarial mosquitoes and in turn between the density of the mosquitoes and the malarial rate. The records on wind velocity and wind direction are used in connection with observations on the habits of flight. The humidity records together with those on temperature are necessary in the work on adult resting habits, longevity, etc.

The biological work deals with the life histories, development and habits of the malarial mosquitoes. It deals with all the relations that the species bear with their environment and their habits, not only under normal and restricted natural condtions, but also their attractions and reactions under controlled conditions. This phase of the work involves an amount of breeding and experimental studies. These studies will yield the information upon which control measures can be based and the survey work will give the condtions under which such measures must be applied to be of practical use.

The pathological work is undertaken only from the parasitic side. It deals with the forms of malarial organisms that occur in the region in relation to the species of malarial mosquitoes found, the examination of the blood of malarial patients to determine the malarial rate, the examination of mosquitoes to determine those species which are the vectors, and the longevity of the malarial parasite in the body of the mosquito host.

The estate selected for the studies is one of the properties of the Maxwell-Yerger Co. at Mound, Louisiana. The town of Mound, situated on Hecla plantation, is the headquarters for all of the estates. Because of this Hecla plantation was selected. The Bureau is especially fortunate in being able to carry on the work in co-operation with Doctor Wm. P. Yerger, a practicing physician of Mound, who is thoroughly conversant with malaria and its treatment. It has been an advantage to make the survey in a location where all malarial cases are reported to one physician, and to have at all times the interest and co-operation of the physician in the work. The work has been further facilitated by the assistance given by Colonel F. L. Maxwell, Mr. Geo. S. Yerger, Mr. Alexander E. Clark and other members of the Maxwell-Yerger Company.

Hecla plantation contains 3,500 acres of land of which 1,800 acres are "open," that is, cultivated, and 1,700 acres are swamp land in timber. The plantation produces cotton, corn, oats, forage crops, live stock and lumber. The crops of the tenants are confined to cotton and corn with cow peas as an intermediate fertilizing crop. 1,191 acres of the "open" land are cultivated by negro tenant farmers, there being 74 negro tenant families on the estate, giving an average of 16 acres per family. The remaining 600 acres of "open" land are given to pasture and plantation crops, worked under the direct supervision of the plantation by day hands.

The negro tenant farmers far outnumber all other classes on this plantation and the owners, therefore, suffer the greatest loss from malaria through this class. The tenants, therefore,

AGE, SEX, AND NUMBER PER FAMILY.
TABLE I.

Map No.	Male				Female				Total
	Und. 8	8–12	12–18	Ov. 18	Und. 8	8–12	12–18	Ov. 18	
121	2	1	2	1	--	1	--	1	8
122	--	1	1	1	1	1	1	1	7
139	1	--	1	2	--	--	3	1	8
61	--	--	--	1	--	--	1	1	4
162	--	--	--	1	--	--	--	1	2
119	--	--	--	1	--	--	--	2	3
131	--	--	--	3	--	--	1	1	5
97	1	--	--	2	--	--	1	2	6
78	--	--	--	--	--	1	--	1	2
79	--	--	--	1	--	--	--	1	2
83	2	--	--	1	1	2	2	1	9
77	--	--	--	1	--	--	--	1	2
123	--	--	--	1	--	--	--	--	1
67	--	--	--	1	1	--	--	1	3
72	--	--	--	2	--	1	--	1	4
74	--	--	--	1	--	--	--	1	2
87	--	--	--	1	--	--	--	1	2
84	--	--	--	1	--	--	--	3	4
113	--	1	--	1	2	--	2	1	7
58	--	--	2	1	--	--	1	2	6
161	1	--	1	1	--	--	--	2	5
75	1	--	2	1	1	--	1	1	7
101	--	--	1	1	--	--	--	1	3
135	1	--	--	1	--	--	--	1	3
118	--	--	--	2	1	--	--	2	5
114	--	--	--	1	1	--	--	2	4
164	--	--	--	1	--	--	--	1	2
125	--	--	3	1	--	--	--	1	5
117	--	--	--	1	--	--	1	1	3
88	--	1	2	--	--	1	--	1	5
133	--	--	--	1	--	--	--	2	3
157	--	--	--	1	--	--	--	1	2
92	--	--	--	1	--	--	--	--	1
81	--	--	--	1	--	1	--	1	3
108	--	--	--	1	--	--	--	1	2
99	1	1	--	1	2	1	1	1	8
109	--	--	--	--	--	--	--	1	1
106	--	--	2	1	2	2	1	1	9
120	1	1	--	1	3	--	--	1	7
76	--	--	--	1	--	--	--	1	2
110	--	2	--	2	--	2	2	1	9
155	1	1	--	1	--	2	--	2	7
104	--	--	--	2	--	--	--	1	3
116	--	--	1	2	--	--	--	--	3
86	--	--	--	--	1	--	--	1	2
132	--	--	1	2	--	--	--	1	4
85	--	--	1	1	--	--	1	1	4
124	--	--	--	1	--	--	--	1	2
65	2	--	1	--	--	1	3	1	8
163	1	--	1	1	1	1	--	1	6
91	--	--	1	1	--	--	--	1	3
156	--	--	--	1	--	--	--	1	2
154	--	--	--	1	--	--	--	2	3
144	--	--	--	1	--	--	--	1	2
73	--	--	1	1	--	--	--	1	3
145	1	--	--	2	--	1	1	1	6
69	--	--	--	1	--	--	--	--	1
160	--	--	--	2	--	--	--	1	3
136	--	--	1	1	--	--	1	3	6
158	--	--	--	1	--	--	--	--	1
107	--	--	--	1	--	--	--	--	1
100	--	--	--	1	--	--	--	--	1
126	--	--	--	1	--	--	--	2	3
111	--	--	--	1	--	--	--	1	2
64	--	1	--	1	1	--	1	2	6
128	--	--	--	1	--	--	--	1	2
115	--	1	1	1	2	--	--	2	7
60	1	--	--	1	--	--	--	2	4
134	--	--	--	1	--	--	--	2	3
102	1	--	--	1	1	--	1	2	6
112	--	1	2	1	1	--	--	1	6
103	--	2	--	1	1	--	--	1	5
96	--	--	--	2	--	--	--	2	4
105	1	--	--	1	1	--	--	1	4
Totals	19	14	29	82	24	18	26	87	299

RECORD OF MALARIA.
Number of Days Ill, Cases Based on Clinical Diagnoses of Physician.
(From May 1 to October 15, 1914.)
TABLE II.

Map No.	Male				Female				Total
	Und. 8	8–12	12–18	Ov. 18	Und. 8	8–12	12–18	Ov. 18	
121	--	8	12	19	--	--	--	--	39
122	--	--	--	--	--	--	--	--	--
139	--	--	--	--	--	--	14	7	21
61	--	--	--	--	--	--	--	14	14
162	--	--	--	--	--	--	--	--	--
119	--	--	--	7	--	--	--	37	44
131	--	--	--	15	--	--	7	--	22
97	--	--	--	--	--	--	--	24	24
78	--	--	--	--	--	--	--	--	--
79	--	--	--	--	--	--	--	--	--
83	--	--	--	--	--	5	--	--	5
77	--	--	--	8	--	--	--	--	8
123	--	--	--	--	--	--	--	--	--
67	--	--	--	--	--	--	--	--	--
72	--	--	--	--	--	--	--	--	--
74	--	--	--	25	--	--	--	--	25
87	--	--	--	--	--	--	--	14	14
84	--	--	--	--	--	--	--	--	--
113	--	--	--	17	8	--	--	16	41
58	--	--	19	--	--	--	--	--	19
161	--	--	--	--	--	--	--	--	--
75	--	--	--	--	--	--	--	--	--
101	--	--	7	--	--	--	--	--	7
135	5	--	--	--	--	--	--	--	5
118	--	--	--	--	--	--	--	7	7
114	--	--	--	14	--	--	--	--	14
164	--	--	--	--	--	--	--	14	14
125	--	--	37	10	--	--	--	--	47
117	--	--	--	--	--	--	--	--	--
88	--	8	3	--	--	--	--	--	11
133	--	--	--	6	--	--	--	--	6
157	--	--	--	13	--	--	--	--	13
92	--	--	--	--	--	--	--	--	--
81	--	--	--	--	--	--	--	--	--
108	--	--	--	20	--	--	--	21	41
99	14	14	--	31	18	7	7	--	91
109	--	--	--	--	--	--	--	--	--
106	--	--	8	30	8	8	--	--	54
120	--	--	--	14	--	--	--	--	14
76	--	--	--	--	--	--	--	--	--
110	--	--	--	5	--	--	--	7	12
155	--	--	--	7	--	--	--	10	17
104	--	--	--	7	--	--	--	5	12
116	--	--	26	--	--	--	--	--	26
86	--	--	--	--	--	--	--	--	--
132	--	--	--	3	--	--	--	--	3
85	--	--	--	9	--	--	--	--	9
124	--	--	--	5	--	--	--	13	18
65	4	--	--	--	--	--	--	6	10
163	--	--	--	--	--	--	--	--	--
91	--	--	--	7	--	--	--	--	7
156	--	--	--	--	--	--	--	7	7
154	--	--	--	--	--	--	--	--	--
144	--	--	--	7	--	--	--	--	7
73	--	--	--	--	--	--	--	--	--
145	--	--	--	--	--	--	--	--	--
69	--	--	--	--	--	--	--	--	--
160	--	--	--	--	--	--	--	--	--
136	--	--	--	21	--	--	--	7	28
158	--	--	--	7	--	--	--	--	7
107	--	--	--	--	--	--	--	--	--
100	--	--	--	--	--	--	--	--	--
126	--	--	--	--	--	--	--	--	--
111	--	--	--	14	--	--	--	--	14
64	--	--	--	--	--	--	--	10	10
128	--	--	--	--	--	--	--	--	--
115	--	--	--	22	--	--	--	35	57
60	--	--	--	--	--	--	--	10	10
134	--	--	--	14	--	--	--	--	14
102	14	--	--	--	--	--	--	--	14
112	--	--	7	10	--	--	--	--	17
103	--	--	--	14	--	--	--	16	30
96	--	--	--	15	--	--	--	12	27
105	7	--	--	7	--	--	--	--	14
Totals	44	30	119	403	34	20	28	292	970

were given first consideration in the survey. As the family is the unit in the tenant system, the family was made the unit in the survey. There are two kinds of tenants, the "renters" and the "share hands." The renters are given the land and cabin and are advanced their subsistence, but furnish their own mules, feed, implements and seed. Under this arrangement the tenant retains three-fourths of the crop as his share and the plantation receives

one-fourth of the crop as rent. The share hands are furnished land, cabin, mules, feed, implements and seed and are advanced their subsistence. Against all of this they place only their labor. Under this system the plantation and the tenant take an equal share. If the crop fails, the tenant has already received his living and the plantation loses not only its one-half of the crop, but the subsistence advanced against the tenant's share. Under the tenant system any reduction in crop returns falls largely upon the plantation owners.

Table I gives an analysis of the 74 tenant families. It shows a total of 299 individuals or an average of four persons per family. The time of a male over 18 years of age is figured as full adult time, a male of from 12 to 18 years as one-half adult time and from 8 to 12 years as one-fourth. The time of a female is figured as equal to one-half the time of the male. No account is taken of the time of either sex under eight years of age.

Table II shows the number of days lost by the families through malaria in the cases reporting to the doctor, giving a total number of 970 days of actual illness. These cases were diagnosed clinically by the physician, supported as far as was practical by examinations of the blood of the patients. Reducing this to adult time we have a loss of 625.5 days. It shows that 48 out of the 74 families were treated by the doctor for malaria. As the cost of the treatment is charged against the tenants on the books of the company, and because of the negroes' natural aversion to proper medical treatment, they are not inclined to report to the doctor unless the attack is serious. In mild attacks of malaria, as with other minor ailments, they either neglect treatment altogether or treat themselves with "chill" tonics or mixtures prepared at home. They are especially negligent in calling upon the physician in the case of their children and the number of cases of malaria recorded in the children is far below the actual number of cases in the opinion of both Doctor Yerger and the writer.

An effort was made to secure an account of the cases not reporting to the physician and the results are shown in Table III. This was possible only by repeated visits during the season to all the families and by consultation with the physician as to the symptoms of those who were ill. The figures are believed to be conservative and doubtful cases were not considered. Many masked forms of the disease in all ages were undoubtedly overlooked. Systematic examination of the blood of all members of the families throughout the season was not practical. There was a total number of 487 days of illness through malaria in the cases not reporting to the physician. Reducing this actual time to adult time we have a loss of 250.75 days of adult time.

Time is also lost by the adult members of a family in attending those members who are ill. Thus adult time will be lost through the illness of an infant, but the two previous tables take no account of loss of time in malarial cases under 8 years of age. In the survey a record was made of the time lost by non-malarial adults in attending the malarial cases in the family. From this record we have a total loss of 385 days representing 235.5 days of adult time.

There was then, this crop season, a total loss of 1842 days through malaria on the part of the members of the tenant families, representing 1066 days of adult time. There were 1457 days of actual illness. Table IV shows the seasonal record and number of malarial cases and the number of persons the cases represent. There were 166 cases in 138 persons out of the total of 299 members of the tenant families. Each malarial attack averaged 8.77 days of illness. Counting all time lost as adult time, there was a loss equal to 6.42 days of adult time for each case of malaria.

Table V gives an analysis of the amount of land, crops, and crop returns of all the 74 tenant families. They cultivated a total of 1191 acres, 743 being cotton and 448 corn. The normal yield for the 743 acres of cotton is 793.25 bales. The normal yield for the 448 acres of corn is 17,635 bushels. The cotton yield this season is 305.93 bales and the corn yield 13,600 bushels, a reduction in yield of

RECORD OF MALARIA.

Number of Days Ill in Cases Not Treated by Physician. (From May 1 to October 15, 1914.)

TABLE III.

Map No.	Male				Female				Totals
	Und. 8	8–12	12–18	Ov. 18	Und. 8	8–12	12–18	Ov. 18	
121	--	--	--	--	--	14	14	--	28
122	--	--	--	--	--	--	--	--	--
139	--	--	4	12	--	--	7	--	23
61	--	--	--	2	--	--	--	--	2
162	--	--	--	--	--	--	--	--	--
119	--	--	--	6	--	--	--	--	6
131	--	--	--	11	--	--	--	5	16
97	--	--	--	--	--	--	--	--	--
78	--	--	--	3	--	--	--	7	10
79	--	--	--	--	14	7	--	--	21
83	--	--	--	--	--	--	--	--	--
77	--	--	--	--	--	--	--	--	--
123	--	--	--	--	--	--	--	--	--
67	--	--	--	4	--	2	--	--	6
72	--	--	--	--	--	--	--	7	7
74	--	--	--	--	--	--	--	--	--
87	--	--	--	--	--	--	--	--	--
84	--	--	--	--	--	--	--	28	28
113	--	--	4	10	--	--	--	10	24
58	--	--	--	--	--	--	--	6	6
161	--	--	--	3	--	--	7	--	10
75	--	--	--	--	--	--	--	--	--
101	--	--	--	--	--	--	--	--	--
135	--	--	--	--	--	--	--	--	--
118	--	--	--	6	--	--	--	7	13
114	--	--	--	--	21	--	--	--	21
164	--	--	--	--	--	--	--	--	--
125	--	--	7	--	--	--	--	--	7
117	--	--	--	--	--	--	--	14	14
88	--	--	--	--	--	--	--	--	--
133	--	--	--	--	--	--	--	--	--
157	--	--	--	--	--	--	--	--	--
92	--	--	--	--	--	--	--	--	--
81	--	--	--	--	--	--	--	--	--
108	--	--	--	4	--	--	--	--	4
99	--	--	--	--	--	--	--	7	7
109	--	--	--	--	--	--	--	--	--
106	--	--	--	--	--	--	--	--	--
120	--	--	--	3	7	14	--	17	41
76	--	--	--	3	--	--	--	7	10
110	--	--	--	--	--	3	--	--	3
155	--	--	--	--	--	--	--	--	--
104	--	--	--	--	--	--	--	--	--
116	--	--	--	21	--	--	--	--	21
86	--	--	--	--	--	--	--	14	14
132	--	--	--	--	--	--	--	--	--
85	--	--	--	--	--	--	--	--	--
124	--	--	--	--	--	--	--	--	--
65	9	--	--	--	--	--	--	--	9
163	--	--	--	4	--	--	--	--	4
91	--	--	--	--	--	--	--	--	--
156	--	--	--	--	--	--	--	--	--
154	--	--	--	--	--	--	--	3	3
144	--	--	--	--	--	--	--	8	8
73	--	--	--	--	--	--	--	--	--
145	--	--	--	6	--	--	7	10	23
69	--	--	--	--	--	--	--	--	--
160	--	--	--	--	--	--	--	6	6
136	--	--	--	--	--	--	--	--	--
158	--	--	--	--	--	--	--	--	--
107	--	--	--	--	--	--	--	--	--
100	--	--	--	--	--	--	--	--	--
126	--	--	--	--	--	--	--	11	11
111	--	--	--	--	--	--	--	7	7
64	--	--	--	4	--	--	--	--	4
128	--	--	--	--	--	--	--	6	6
115	--	7	4	--	--	--	--	6	17
60	--	--	--	--	--	--	--	5	5
134	--	--	--	--	--	--	--	--	--
102	--	--	--	7	--	--	--	--	7
112	--	--	--	--	--	--	--	--	--
103	--	7	--	--	--	--	--	--	7
96	--	--	--	11	--	--	--	10	21
105	--	--	--	--	--	--	--	7	7
Totals	9	14	19	120	42	40	35	208	487

SEASONAL RECORD AND NUMBER OF MALARIA CASES

(From May 1 to October 15, 1914.)

TABLE IV.

Map No.	May	June	July	August	September	October	Tertian	Estivo-autumnal	Total No. of Attacks	Total No. of persons in family	No. of malarial persons.
121	--	2	--	1	1	--	4	--	4	8	3
122	--	--	--	--	2	--	2	--	2	7	2
139	--	--	2	1	--	--	3	--	3	8	2
61	--	1	2	1	--	--	4	--	4	4	4
162	--	--	--	--	1	--	1	--	1	2	1
119	--	2	--	1	--	--	3	--	3	3	3
131	1	1	2	--	--	--	4	--	4	5	3
97	--	--	--	2	--	1	3	--	3	6	3
78	--	--	--	--	--	--	--	--	--	2	--
79	--	--	--	--	1	1	2	--	2	2	2
83	--	--	--	2	1	--	3	--	3	9	3
77	--	1	--	--	--	--	1	--	1	2	1
123	--	--	--	--	--	--	--	--	--	1	--
67	--	--	--	--	--	--	--	--	--	3	--
72	--	--	--	--	--	2	2	--	2	4	2
74	--	--	1	1	2	--	1	3	4	2	2
87	1	1	--	--	--	--	2	--	2	2	1
84	--	--	--	--	1	2	3	--	3	4	3
113	2	--	--	3	1	--	4	2	6	7	3
58	--	--	1	1	3	1	6	--	6	6	4
161	--	--	--	--	1	--	1	--	1	5	1
75	--	--	--	--	1	1	2	--	2	7	2
101	--	--	--	--	--	1	1	--	1	3	1
135	--	--	--	--	--	1	1	--	1	3	1
118	--	2	--	1	1	--	4	--	4	5	3
114	--	--	--	1	1	--	2	--	2	4	2
164	--	--	--	--	1	--	1	--	1	2	1
125	--	1	--	3	--	1	5	--	5	5	4
117	--	--	1	--	--	--	1	--	1	3	1
88	--	--	--	1	1	--	2	--	2	5	2
133	--	--	--	1	--	--	1	--	1	3	1
157	--	1	--	--	1	--	2	--	2	2	1
92	--	--	--	--	--	--	--	--	--	1	--
81	--	--	--	--	--	--	--	--	--	3	--
108	1	--	1	--	1	--	2	1	3	2	2
99	--	5	--	1	3	--	7	2	9	8	7
109	--	--	--	--	--	--	--	--	--	1	--
106	--	2	--	3	1	--	3	3	6	9	4
120	--	2	--	2	1	1	6	--	6	7	4
76	--	--	1	1	--	--	2	--	2	2	2
110	--	1	--	1	1	--	3	--	3	9	3
155	--	1	1	--	--	--	2	--	2	7	2
104	1	--	--	1	--	--	2	--	2	3	2
116	--	1	1	--	--	--	--	2	2	3	2
86	--	--	--	1	--	--	1	--	1	2	1
132	--	--	--	1	--	--	1	--	1	4	1
85	--	--	--	--	1	--	1	--	1	4	1
124	1	2	--	--	--	--	3	--	3	2	2
65	1	--	--	1	--	1	3	--	3	8	2
163	--	--	--	--	--	1	1	--	1	6	1
91	--	--	--	1	--	--	1	--	1	3	1
156	--	--	--	--	1	--	1	--	1	2	1
154	--	--	--	--	1	--	1	--	1	3	1
144	1	--	1	--	--	--	2	--	2	2	2
73	--	--	--	--	--	--	--	--	--	3	--
145	--	--	--	1	2	1	4	--	4	6	4
69	--	--	--	--	--	--	--	--	--	1	--
160	--	--	--	--	--	1	1	--	1	3	1
136	--	--	2	--	--	--	1	1	2	6	2
158	--	1	--	--	--	--	1	--	1	1	1
107	--	--	--	--	--	--	--	--	--	1	--
100	--	--	--	--	--	--	--	--	--	1	--
126	--	--	--	1	--	1	2	--	2	3	1
111	--	--	1	1	--	--	2	--	2	2	2
64	--	--	--	1	--	1	2	--	2	6	2
128	--	1	--	--	--	--	1	--	1	2	1
115	1	1	2	--	1	1	6	--	6	7	5
60	--	1	--	--	--	1	2	--	2	4	1
134	1	--	--	--	--	--	1	--	1	3	1
102	--	--	2	--	--	--	2	--	2	6	2
112	1	1	--	--	--	--	2	--	2	6	2
103	1	--	1	--	1	--	2	1	3	5	3
105	--	--	1	--	2	--	2	1	3	4	3
96	2	--	2	1	--	1	3	3	6	4	4
Totals	15	31	25	38	36	21	147	19	166	299	138

487.32 bales of cotton and 4,035 bushels of corn from the normal. The greatest factor in the reduction of the cotton yield is the boll weevil, but the boll weevil does not explain the reduction in the yield of corn. Having recently returned from the field, there has not

LOCATION, AMOUNT OF LAND, CROPS AND PRODUCTION.

TABLE V.

Map No.	Total acres	Acres Cotton	Acres Corn	Production (cotton in bales) corn in bushels. Normal cotton	Normal corn	Estimated cotton	Estimated corn	Reducation cotton	Reducation corn
121	28	18	10	18	350	12	250	6	100
122	18	10	8	10	360	2.5	280	7.5	80
139	25	12	13	15	585	3	585	12.	0.0
61	18	12	6	12	210	6	150	6	60
162	8	8	0.0	8		2		6	
119	11	7	4	7	140	3.5	120	3.5	20
131	18	12	6	12	240	3	180	9	60
97	18	0.0	18		810		720		90
78	8	5	3	5	90	1.25	45	3.75	45
79	15	12	3	12	75	4	45	8	30
83	35	28	7	28	245	14	210	14	35
77	30	20	10	20	350	5	250	15	100
123	12	8	4	8	140	2.66	120	5.34	20
67	10	7	3	7	75	1.75	54	5.25	21
72	7	5	2	5	50	1.66	40	3.34	10
74	14	10	4	10	120	3.33	100	6.67	20
87	7	5	2	5	60	2.50	50	2.50	10
84	12	9	3	9	90	3	60	6	30
113	20	14	6	14	210	7	180	7	30
58	20	12	8	12	280	4	200	8	80
161	40	25	15	25	525	8.33	375	16.67	150
75	25	18	7	18	210	6	140	12	70
101	16	9	7	11.25	315	3	210	8.25	105
135	16	11	5	13.75	200	2.75	150	11	50
118	20	12	8	15	320	8	240	7	80
114	12	9	3	9	105	7	90	2	15
164	11	7	4	7	120	2.33	100	4.67	20
125	20	12	8	15	360	6	280	9	80
117	14	8	6	10	240	2.66	180	7.34	60
88	10	7	3	7	90	3.50	75	3.50	15
133	14	8	6	10	240	2	180	8	60
157	22	14	8	14	240	7	200	7	40
92	15	0.0	15		750		600		150
81	10	7	3	7	90	2.33	60	4.67	30
108	18	12	6	15	240	4	180	11.	60
99	35	0.0	35		1,575		1,050		525
109	7	5	2	5	60	2.5	50	2.5	10
106	28	20	8	20	320	6.66	240	13.34	80
120	20	12	8	15	320	6	240	9	80
76	7	7	0.0	7		2.33		4.67	
110	35	25	10	31.25	500	18.75	350	12.50	150
155	15	10	5	10	150	3.33	125	6.67	25
104	16	11	5	11	200	5.5	125	5.5	75
116	20	12	8	15	400	6	256	9	144
86	6	5	1	5	30	2.5	25	2.5	5
132	10	0.0	10		450		350		100
85	25	18	7	18	245	6	175	12	70
124	14	10	4	12.5	160	5	120	7.5	40
65	22	16	6	16	210	5.33	150	10.67	60
163	12	9	3	9	90	3	75	6	15
91	12	10	2	10	80	2	80	8	0.0
156	16	12	4	12	140	4	100	8	40
154	6	6	0.0	6		2		4	
144	12	8	4	8	140	2.66	100	5.34	40
73	16	9	7	9	280	3	175	6	105
145	13	9	4	9	120	3	80	6	40
69	7	7	0.0	7		3.5		3.5	
160	15	10	5	10	150	5	125	5	25
136	18	12	6	15	240	4	180	11	60
158	9	7	2	7	70	2.33	50	4.67	20
107	7	5	2	5	80	1.66	60	3.34	20
100	15	0.0	15		675		675		0.0
126	17	10	7	12.5	280	5	245	7.5	35.
111	19	12	7	15	280	6	245	9	35
64	18	13	5	13	150	4.33	125	8.67	25
128	18	12	6	15	240	9	210	6	30
115	12	8	4	8	160	2	140	6	20
60	9	7	2	7	60	3.5	50	3.5	10
134	18	12	6	15	270	3	210	12	60
102	7	5	2	5	80	2	60	3	20
112	18	13	5	13	200	6.5	150	6.5	50
103	18	13	5	13	225	6.5	150	6.5	75
96	7	0.0	7		280		210		70
105	15	10	5	10	200	5	150	5	50
Totals	1,191	743	448	793.25	17,635	305.93	13,600	487.32	4035

been sufficient time to carry the analysis of the figures obtained far enough to indicate the actual part malaria played in this great reduction of crops. The actual loss during the crop season of over a thousand days of adult time from malaria is significant.

Three species of *Anopheles* occur in the vicinity of Mound, Louisiana, namely, *Anopheles quadrimaculatus, A. punctipennis,* and *A. crucians.* In the work on the density of mosquitoes in and about the houses on the estate the following total collections of individuals of these species were taken:

SPECIES	May	June	July	Aug.	Sept.	Oct.	Total
A. quadrimaculatus	834	1,280	5,779	6,337	4,293	267	18,790
A. punctipennis	16	3	1	----	4	3	27
A. crucians	----	1	----	2	----	----	3

From the above figures it is apparent that *Anopheles quadrimaculatus* was the species concerned as the conveyor of malaria in this region during this crop season. Table VI

TABLE VI.

Summary of the Density Record of Anopheles Quadrimaculatus.
(From May 1st to October 15th, 1914.)

	Total Specimens Collected	No. of Collection	No. of Locations	Weighted Avg. per da. from one location.
May	834	28	9	8.37
June	1,280	31	13	13.06
July	5,779	53	70	48.74
August	6,337	24	27	127.58
September	4,293	52	88	38.17
October	267	32	45	4.63
Totals	18,790	220	160	
Total weighted avg.				33.38

gives a summary of the seasonal work on the density of this species. Beginning in May there was a rise in the density of this species up to September first. The seasonal records of malaria cases, the seasonal density of this species of *Anopheles,* and the records of temperature and rainfall will be compared.

The biological work is yielding some very suggestive results. The records on breeding places show that *Anopheles quadrimaculatus* is partially domestic in its breeding habits. It was taken from water stored in cisterns and in barrels, from water in surface wells and from troughs used for watering stock. The capacity of these artificial collections of water for the production of this species is not great enough

to account for the density of the species in and about the cabins. Other collections of water of an artificial nature yielding larvae of this species, as follows: Barrow-pits along the levee and railroad, a disused irrigation canal, holes from wagon ruts in the road, excavations about buildings and ditches along roadsides. Greater numbers were found in the bayous, seasonal sloughs, pools in the woods and pastures and holes from uprooted trees. The work on the bionomics of the species is necessarily slow. A single observation or the combined observations of a single season do not determine the habits, what the species will or will not do under certain known conditions. Time will not permit a more detailed discussion of this phase of our work.

I will bring my paper to a close with some ideas suggested by the results of the work. While definite information has not been obtained on the limits of flight of this species from breeding places to cabins or the extent of the migration of individuals from cabin to cabin, the density record indicates that all cabins are within the zones of flight, that is, no particular location within the boundaries of the plantation is without the limits of flight from the breeding sources. In the Federated Malay States, on the other hand, the limits of flight from breeding places to houses were determined, and it was possible to locate the laborers' quarters without these limits, which resulted in a great reduction of malaria among the laborers. When we have established the limits of flight for the species with which we are dealing, however, the breeding places within a particular area will be eliminated in a zone wide enough to meet the limits of flight and favorable as to location of cabins in respect to the plantation operations, and cabins will be centered at that place to determine the effect on the density.

It was found that in open collections of water of a permanent character, having margins free from vegetation or trash, the top-minnows and predaceous adquatic insects were very effective in controlling the larvae of *Anopheles* and other species of mosquitoes. Wherever, on the other hand, the margins were grass-grown or the water shallow enough to support aquatic vegetation, or trash was found on the surface, or the channel was blocked by logs, stumps, brush or other debris, the larvae were found to thrive in the presence of numerous fish. In fact, one would often secure one or more top-minnows and several larvae of *Anopheles* in the same dipperful of water when collecting in such locations. The contrast of conditions in a bayou in this respect is shown in Figs. 1 and 2.

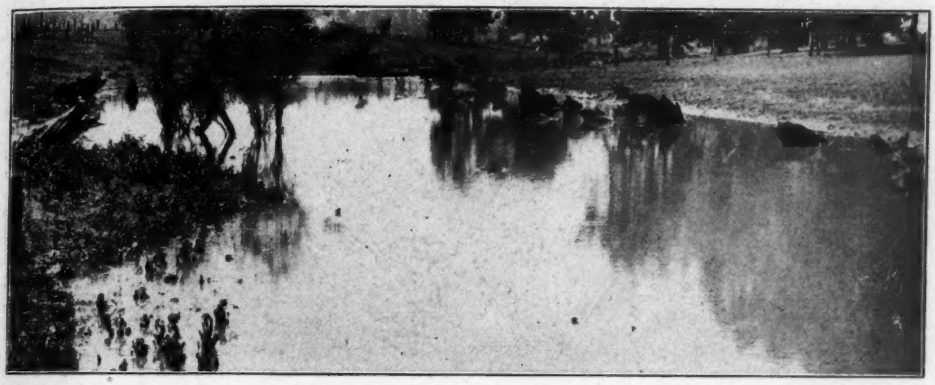

Fig. 1—Bayou showing open water with margins practically free from vegetation and trash—conditions unfavorable to mosquito development in the presence of fish.

In regard to the screening of houses against the entrance of adult *Anopheles,* it was found that the larger meshes of wire cloth not only permitted an entrance to the house, but that the use of such wire cloth insured a greater or less number becoming imprisoned in the house, for the reason that a mesh which will allow the entrance of an unfed mosquito seeking a blood meal will not allow the engorged mosquito to escape. If the household contains a malarial patient or carrier, the infection of the entire household is thus insured. The same applies to defective screening or carelessness in allowing *Anopheles* to filter into the house through the door and window openings, or the fire-place flue in a screened house of the proper mesh.

The low temperature of winter is an important check to mosquito development in this region. It would be expected that the period maximum density of mosquitoes would coincide with the period of maximum accumulations of surface water, and this would be true if maximum surface water coincided with period of maximum temperature, but the rainfall is more abundant during the fall and winter months, at which time occur the minimum temperatures unfavorable to mosquito development.

In at least two respects high water is unfavorable to mosquito development in the presence of top-minnows, (1) in those instances where the water level over marshy ground is raised above the level at which the aquatic vegetation will thrive, thus destroying the protection from the fish; and (2) in the rise of the water level to sufficient height to overflow into independent fishless accumulations of water, allowing the fish entrance to these places. An experiment will be tried in removing the trees, logs and stumps and raising the water level in one of the bayous to a height sufficient to destroy the vegetative growth in the bed of the bayou, giving open water throughout its course, and then the margins will be kept free from grass and trash, which will allow the top-minnows and predaceous aquatic insects access to the entire surface area. The effect of these conditions on the capacity of the bayou for mosquito production will be noted.

Fig. 2—Bayou with aquatic vegetation in bed and grassy margins with trash—conditions very favorable to mosquito development notwithstanding the presence of fish.

There is presented herewith a report on a comparative study made at Scott, Arkansas, by Mr. Jas. K. Thibault, Jr., a member of the force of this Bureau.

A COMPARATIVE STUDY ON THE LOSSES TO RURAL INDUSTRIES FROM MALARIAL MOSQUITOES*

By James K. Thibault, Jr.,
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Washington, D. C.

The present season at Scott, Arkansas, has been from beginning to end exceptional for this locality, and in every way unfavorable for mosquito development. As a result very little work has been possible, and such data as I have been able to secure relates to an exceptional season, and gives no idea of normal conditions.

The cold weather of late winter and early spring continued several weeks longer than usual, so that by the first weeks of April, instead of ideal breeding conditions for the early species of mosquitoes, the weather was unusually cold. On this account breeding was delayed several weeks and when finally it did get well under way, the unprecedented drought, which commenced about the middle of May, began to be felt. The total absence of rain in this locality for about sixty days, together with the intense heat and continued brisk wind, eliminated not only all the smaller breeding places, but many of the larger and what are generally considered the permanent bodies of water.

The effect of such unfavorable weather for breeding upon mosquito life was striking. As early as the first of June the absence of male mosquitoes from the collections indicated the drying up of most of the suitable breeding places. By the middle of June the collection of adult mosquitoes had fallen off fully 98 per cent. Even in the vicinity of permanent breeding places, the adults were not very active. So intense was the heat and so dry the atmosphere that the mosquitoes were driven from all out-houses and most of the smaller dwellings and from even rank growths of vegetation, all of which normally gave adequate protection. At this time I took most of the adults from underneath dwellings.

Anopheles quadrimaculatus (Say) was taken in every house in which I have visited malarial cases, except one, and this was a case which relapsed at a time when very few mosquitoes were to be found anywhere. In every case a breeding place has been found within fifty yards of the dwelling, often at a much shorter distance. These breeding places have in most instances been natural collections of water of a permanent or semi-permanent character. On the other hand I found that an old unused cistern seemed to supply the mosquitoes for two houses. The larvae of this species were taken frequently this season in rain barrels and in cisterns, but I found it very difficult to rear them to the adult condition in the water from such places. I have not found Anopheles breeding in either foul or very muddy water.

No evidence was obtained that adults fly far from their breeding places, however, where breeding places are numerous exact data are difficult to obtain. Negative results were obtained in an interception experiment where flight traps were placed over water and situated approximately 250 yards from either bank.

With the season so unfavorable for mosquito development, the malarial rate was proportionally low and in order that some idea of the average conditions may be formed, I will give our figures for the last four years:

MALARIAL RATE AT SCOTT, ARKANSAS.

Year	Tot. blood smears examined	Aestivo-autumnal	Tertian	Quartan	Tot. cases malaria	Per cent. malaria
1911	898	27	203	----	230	25.61
1912	723	33	245	----	278	38.45
1913	1009	38	290	----	328	28.74
1914	793	34	39	3	76	8.88

The record for 1914 extends only to October 1. The per cent for the first nine months of

*Read in Section on Medicine, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., November 9-12, 1914, by Mr. D. L. Van Dine in connection with his paper "Losses to Rural Industries through Mosquitoes that Convey Malaria."

1913 was 23.58. The highest rate during 1913 was 44.65 for October. The highest rate during the first nine months of 1914 was 23.86 for September.

On the plantation where a study was made of the amount of malaria during the crop season, and the loss of time resulting therefrom, there was a total of only 12 malarial cases, of which seven were estivo-autumnal and five were tertian. There were two relapses. The patients lost an average of 5.50 days for each attack. There was an average loss of three days of time in nursing for each attack, making an average loss of time in the family of 8.50 days for every case of malaria. There was a total loss of time of 102 days during the crop season on this plantation from malaria.

From the above figures two facts stand out prominently. One is the very small percentage of malarial cases for this season, and the other is the very high percentage of estivo-autumnal and quartan infections. It is evident that these types of malaria were more resistant to the unfavorable influence of the peculiar weather conditions, but whether or not the survival of these types over the tertian was due to influences acting on them while in the body of man or that of the mosquito, I am not prepared to say.

The great amount of time lost by the patients, an average of 5.50 days for each attack, I attribute to the prevalence of the estivo-autumnal infection, which on this plantation actually outranked the tertian.

While it is difficult to estimate the time lost by those individuals who were not sick enough to require the services of a physician, or rather, who preferred to treat themselves, it is well known that these cases, which for lack of proper treatment are more or less chronically infected, represent a large proportion of the loss in labor to the plantation. Owing to the fact that no considerable amount of time is lost for any one attack, these cases are often overlooked.

The observations herein recorded refer strictly to the present season and the anopheline involved is *Anopheles quadrimaculatus* (Say).

THIRTY CASES OF MALARIA, ESTIVO-AUTUMNAL, TREATED WITH QUININE INTRAVENOUSLY.*

By Thos. E. Wright, M.D.
Monroe, La.

Medical history teaches that since the first time quinine was administered intravenously, twenty-four years ago, there has been more or less interest manifested by the workers in malaria in the intravenous method.

I beg an apology, if an apology is proper, for presenting this paper not so much in the light of a scientific worker and for his information and edification, but for the chief benefit of the average practitioner in the South, who comes into such intimate contact with malaria in all its phases, and has such wonderful opportunities for the relief of suffering and the saving of life therefrom.

The history of malaria, the devastation it has wrought, the enormous cost in lives and efficiency, should make us keenly alive to every advance leading to a better understanding of the disease, especially its prevention and cure.

The Missouri Pacific Railroad has established in Monroe, La., a Division Hospital for the treatment, both medical and surgical, of its employes. The territory sending men to this hospital extends nearly across this state and well up into Arkansas, covering about five hundred miles of track, and in many places traversing some very malarious districts. This hospital, therefore, gives an excellent opportunity for the study of malaria. As a member of the Missouri Pacific Hospital Staff, I have had under my care at this place from 125 to 175 cases of

*Read in Section on Medicine, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., November 9-12, 1914.

malaria each season. During this time we have made several observations and from them has developed an impression that we need a treatment that will more quickly, safely, and constantly bring about a favorable change in a malarial patient than the treatments at present usually employed, that is, quinine by mouth and needle.

Case 1—C. C. B., admited to hospital September 3, 1914; age 38; male colored. Brought to the hospital by an attendant who could give very little information other than that patient had been ill for about a week. Patient delirious; temperature 104; pulse 110; enlarged spleen; blood examination revealed many young estivo-autumnal plasmodia, four to six to a field. The temperature went rapidly to 105; pulse 120. At 6 p.m. the patient was given intravenously fifteen grains of quinine hydrochlorid in 300 c.c. saline. At 9 o'clock the next morning the temperature was normal, the patient was weak, but rational. The second day the treatment was repeated; the temperature going to 100.4; pulse 86. During the second night the temperature again reached normal and the fever did not again return. Patient discharged on the sixth day, reported six weeks later no return of fever. These two intravenous treatments and some purgative were all the medicines the patient received.

This, in brief, is the story of my first intravenous use of quinine.

Coming in rapid succession were many other cases, the majority of which were estivo-autumnal, with symptoms more or less severe than the case above referred to. From this number were selected twenty-nine other cases to whom the quinine was administerd intravenously, making a total of thirty cases so treated.

The purpose of this paper is to report and discuss this series of thirty cases, treated without any accident, each receiving the same dose and in the same dilution, which report is at present a part of the record of the Missouri Pacific Hospital at this place.

The cases were all proven estivo-autumnal by blood examination, and this type was taken for this special treatment because of the frequency of its development into the pernicious type and the high mortality rate therefrom. Each patient treated was given the same dosage of quinine, fifteen grains of the hydrochlorid, in the same dilution, 250 to 300 c c of saline, as I have mentioned above.

Observations were made along seven different lines.

First, the effect on the patient during and following the administration of the drug.

Second, the effect on the kidneys as evidenced in the urinary output and by urinalysis, before and after.

Third, the effect on the blood with reference to any hemolytic action that the quinine might have, which action would be evidenced by hemoglobin in the urine.

Fourth, the effect on the temperature, immediate and remote.

Fifth, the effect on the circulation, immediate and remote.

Sixth, the effect on the malarial parasite.

Seventh, subjective data.

The immediate effect on the patient is unquestionably slight. Head symptoms appear to predominate. Some of the patients describe the feeling as a fullness, others a slight dizziness, others a roaring sensation. This is noticed and not infrequently mentioned by the patient when the container still holds from 75 to 100 c c, or in other words, when the patient has received from 200 to 250 c c. This sensation is only temporary, is not alarming, is not present in every case, and in a few minutes has passed. I mention it here largely because it is calculated to concern unduly the physician during his first or second trial of the treatment. Candidly, I am inclined to believe it is not due to the quinine, but to the slight change in the equilibrium of the circulation, by increasing the circulating fluid by 300 c c or more. The same principle is involved doubtless in the vertigo associated so often with high blood pressure. For this same reason I have not used a larger quantity of solution than 300 c c, unless the condition of the patient warranted it. Increasing the quantity of the solution will

doubtless increase the discomfort of the patient.

Patients critically ill with high temperature usually vomit immediately after the infusion. However, they did not complain of head symptoms. Vomiting can be expected in nearly every case when the fever is high. Of the fourteen patients who vomited, it did not persist longer than a few minutes, except in one case, which responded promptly to a small dose of morphine by needle. It has been noted that the signs of an impending attack of vomiting are a slight restlessness, a tendency to be impatient for the proceedings to be finished, the respirations becoming more or less sighing in character. These are almost infallible signs and are to be expected. In none of the cases did vomiting ensue until after the infusion was completed.

I mention these symptoms above for the same reason as those before mentioned, in order to give assurance to the physician in his first cases.

The urinary output, as well as complete urinalysis, was studied in twelve selected cases and nothing of importance was found that would show the kidney to be influenced unfavorably by the treatment.

Experimental hemolysis in a test tube has taught us some rather important lessons about hemolysis that may be produced within the body. Hence the urine was watched with considerable interest to see if the treatment had to any extent so influenced the patient. Sixteen out of the thirty were followed and the reports are negative.

The effect on the temperature can best be appreciated by an analysis of the series when the cases are assembled, which has been done and which becomes a part of this report. It will be noted from this that four cases did not have fever at the time of treatment; of the twenty-six cases with fever at the time of infusion, twelve had no fever all of the following day. The average temperature of the twenty-six cases with fever at the time of the first infusion was 100.8. The average highest point of temperature the first day after the infusion of the twenty-six cases was 99.5. The average number of hours, of the twenty-six cases, until the temperature reached normal was 18. Of the twenty-six cases, twenty-one reached normal temperature within the first twenty-four hours after infusion.

The effect on the circulation, immediate and remote is negligible. The pulse rate follows the temperature curve in the usual manner. Observations along the line of blood pressure were not made.

A careful study of the blood of twelve of these cases gives the impression that the influence on the malarial parasite is not unlike that already described when quinine is given by other methods. The chromatin and protoplasm both stain a much deeper color, and the ring forms show a distortion that has also been described, but the distortion in these cases appears to be more exaggerated. These bizarre shapes assumed are at once interesting and amusing. It is agreed, of course, that this is due to the increased ameboid movement of the parasite. The length of time in which the parasite persists in the circulation blood after infusion has been found to be variable; and its presence or absence after infusion, when the temperature is normal, is not to be considered a measure of the benefit derived by the patient from the treatment. This variability is due more to the time in the life cycle of the plasmodium in which the observations are made than to the influence of the quinine.

Within thirty-six hours after the first infusion the majority of the patients describe their improvement in general feelings and appetite in very satisfactory terms. So enthusiastic did many of the convalescents become that they would insist upon a second or third infusion before going back to work, and I do not think that the spectacular feature involved influenced them in the least. Living in a malarious district many of these patients had frequently taken quinine by mouth for pre-

vious attacks. Their comparison of the two methods was decidedly in favor of the infusion.

It will be noted from the assembled cases that out of a total of forty-eight infusions given there were ten reactions. These reactions almost invariably followed an infusion when the solution was made up of water, although distilled and sterile, yet not freshly distilled. In the thirty-eight infusions giving no reaction, with the exception of possibly one or two, the solution was made up with freshly distilled water. This should be considered of considerable importance; however, the absence of freshly distilled water should not deter any doctor from giving an infusion when it is indicated.

The technique is simple and is the same as that of giving any ordinary infusion. Certainly, the vein is not exposed, the puncture going in through the skin alongside of the vein to get a shoulder or skin support for the needle, then plunged into the vein. With practice the vein may be felt through the tissues and fat even when it is not visible, and puncture may then be made. This, of course, requires practice and a certain degree of skill. The chief use of an assistant is in the management of the tourniquet. Not infrequently I have taken the convalescents in pairs, each one acting as assistant while the other is given the treatment. No special effort was made except at first to keep the patients in bed or have them lie down immediately after the infusion.

Any convenient and prominent vein on an extremity is satisfactory. It is a good plan to examine both arms. The back of the hand may be selected, as was done in one case in this series, if the veins in this locality are more desirable. Should the needle during the infusion get out of the vein, or in making a puncture transfix a vein, there will be a leakage into the tissues, in the first case of the quinine solution (which in this dilution is not unduly irritating), and in the second case the leakage will be of blood, either of which accidents necessitates another puncture, prefera-

ANALYSIS OF THIRTY CASES.

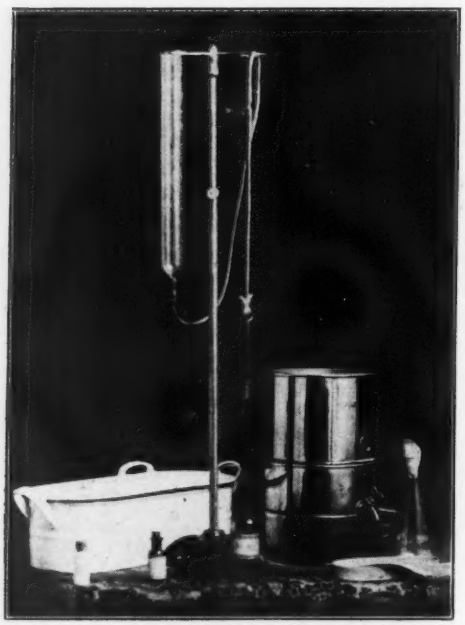
Case No.	Acute	Relapsing	No. of Infusions	No. of Reactions	Vomited	Temperat'e at time of Infusion
1	1	----	2	1	yes!	102
						99
2	----	1	3	0	0	100
						99
						99
3	1	----	1	0	0	97
4	1	----	3	0	yes 1	105
						99.4
						98
5	1	----	2	0	0	102.6
						97.4
6	1	----	1	0	0	99
7	1	----	1	0	0	99
8	1	----	2	1	yes 1	104
						98
9	1	----	1	0	yes 1	105
10	1	----	1	0	yes 1	105
11	1	----	1	1	yes 1	105
12	----	1	2	2	yes 1	105
						99
13	1	----	2	1	yes 1	102
						101
14	----	1	2	0	yes 1	102
						98.6
15	----	1	1	0	0	98.6
16	----	1	2	1	yes 1	103
						99.1
17	1	----	1	1	yes 1	102.1
18	----	1	2	0	yes 2	101
						102.1
19	----	1	2	0	1	104
						98
20	1	----	2	0	0	99.6
						98
21	1	----	2	0	0	100
						99
22	1	----	1	0	0	100
23	1	----	1	1	yes 1	99.8
24	1	----	1	0	0	100
25	1	----	1	0	0	98
26	1	----	1	0	0	102
27	1	----	1	0	0	102
28	----	1	2	1	yes 1	102
						98
29	1	----	2	0	0	101
						98.6
30	----	1	2	0	0	97.1
						97
Totals	21	9	48	10	15	100.8*

*Average.

Case Number	Temperature Normal in hours	Highest Temperature day following Infusion	Days in Hospital	Treated Cases Relapsed
1	24	102	6	----
2	16	100.2	11	----
3	----	97.6	9	----
4	24	100.4	9	----
5	4	98.8	8	----
6	5	98	5	----
7	3	97.8	6	----
8	50	130.8	6	----
9	29	102	6	----
10	11	99.8	5	----
11	38	101.8	6	----
12	12	99.6	6	----
13	16	99.6	5	----
14	12	97.8	6	1
15	----	98	5	----
16	10	98	10	1
17	48	101	5	----
18	24	99.4	8	1
19	24	97.8	8	----
20	6	97.8	8	----
21	2	98	4	----
22	22	98.8	4	----
23	32	101	5	----
24	17	98	5	----
25	----	----	6	----
26	15	98	5	----
27	15	97	4	----
28	24	104	5	----
29	10	98	4	----
30	----	97	6	----
Average for 30 cases	18	99.5	6 1-6	Total

bly in the other arm. These are commonplace facts, known only too well by the majority of physicians. However, it is deemed proper to mention them for the sole benefit of the physician who is not accustomed to giving infusions of any kind. Of course, it need not be mentioned, because it is so evident that strict asepsis is of paramount importance and the first requirement.

The accompanying photograph of the assembled apparatus and supplies recommended for use in this method of treatment is purely suggestive, and is furnished for the purpose of illustrating the simplicity and cheapness of the necessary material. You will note a simple salvarsan outfit, an ordinary sterilizer, a water still, boiling and mixing flask, tourniquet, alcohol, collodion, cotton, sodium chlorid tablets and a bottle of quinine tablets. The total cost of the outfit should not exceed $20.



Apparatus used by the author in giving quinine intravenously.

The bugaboo called "air embolism" has deterred many a physician from his plain duty when indications pointed to intravenous therapy, not limited to quinine. Many good physicians regard intravenous therapy a surgical procedure barely exceeded in gravity by a laparotomy, while others regard it only in the light of institutional work.

To be given twenty-five to thirty grains of quinine by mouth each day for from two to four days, with the consequent nausea, vomiting and hateful anorexia, then to repeat this procedure once every week for three or four weeks, gentlemen, is not the gracious thing to accept that we ordinarily imagine it to be. To have the pain of a hypodermic injection of quinine with the fair chance of a slough and danger of infection not justified by such a small amount of absorption of the drug used, is also accepted under protest. Before local anaesthesia came to us we held our patients, extracted their teeth, and lanced their boils. It should not be questioned why men are reaching out for a better plan.

In further explanation of the assembled cases, when more than one infusion was given, the chief record, as temperature, etc., are noted from the first infusion. Cases Nos. 3, 15, 25 and 30 had no fever at the time of infusion. No record of temperature in case 25 after infusion. The average number of days in the hospital for the thirty cases was six and one-sixth days.

It is of considerable interest to note that three cases in this series had a relapse, returning to the hospital later with all symptoms of previous attack, including plasmodia in the blood. It must also be remembered that an insufficient length of time has elapsed since the beginning of the series on September 3, 1914, to be sure that none of the remaining twenty-seven cases would also relapse. The further history of these cases, together with other details and new cases we hope to report in the future.

In the light of our present knowledge on the subject, we feel entitled to a few conclusions:

1. The intravenous use of quinine in doses of 15 grains in a dilution of 250 to 300 c. c.

of saline in the hands of a careful, competent physician is safe.

2. The discomfort to the patient is so slight it becomes a matter of small importance, and in this respect when compared with quinine by mouth or hypodermic is much to be preferred.

The number of doses for the different types of malaria, the proper time to elapse between their administration, the exact dosage and dilution necessary and safe, the permanency of the relief of symptoms, are problems that will be worked out.

4. The relief from the symptoms in malaria, so often jeopardizing life, may be obtained very promptly, safely and constantly by this method.

REPORT OF THE MALARIA COMMISSION OF SOUTHERN MEDICAL ASSOCIATION.

By C. C. Bass, M.D., Chairman,
New Orleans, La.

The activities of the commission since the last report have been limited to the individual efforts of the members. The number of papers published during the year by the members of the commission has been approximately fifty, and the number of public addresses approximately twenty-five. The greatest amount of this work by any one member has been done by Surgeon von Ezdorf, of the United States Public Health Service, and who has been acting in his official capacity as such.

The commission is now engaged in preparing a short treatise on malaria which is to cover the fundamental principles of diagnosis and treatment which should be known by every member of the medical profession.

It is contemplated to give this pamphlet wide circulation by placing it in the hands of all physicians in the malaria section.

At the last meeting of the Southern Medical Association one hundred dollars was voted for the expenses of the commission. Up to this time we have used about fifteen dollars for stationery and postage. We recommend that the balance of this appropriation stand for the further expenses necessary for the work outlined.

The commission endorses the work of the United States Public Health Service, and earnestly hopes for its continuation and amplification.

The commission is anxious to represent truly the Southern Medical Association, and will welcome practical suggestions as to its future work. Such suggestions should be communicated to the Chairman, Dr. C. C. Bass, New Orleans, La.

DISCUSSION ON MALARIAL PAPERS.

Surgeon-General W. C. Gorgas, United States Army, Washington, D. C.—Malaria is probably the most important disease with which we have to deal in the question of tropical sanitation, and it is a very important disease in the lower parts of the temperate zone as you approach tropical regions.

My interest and experience have been principally in dealing with general measures pertaining to it. The papers that have been read have particularly called my attention to that phase. A measure, for instance, that will succeed in seven-tenths of the cases, and that is simple and practicable, is better than a more elaborate set of measures that will succeed in nine-tenths of the cases. When we come to thickly settled and populous countries that have governmental organizations, and where the government can assist, we can adopt more elaborate measures. But as a general thing, my thoughts and experiences have run along the lines of advice to people, such as the farming population. I have specially in my mind, for instance, the cases of malaria in Rhodesia, where I was last winter in the tropics. There malaria was troubling them a good deal. I believe the individual farmer, at a reasonable expense, can protect himself against malaria in going into a new or an old country. If he will clean away the brush around his dwelling, drain for a distance of two hundred yards, screen with wire netting his house until conditions are under control, and take prophylactic quinine, he can go into any part of the world and protect himself and live in health. That was in general the advice which I gave the Rhodesian Government in brief concerning the Zambesia River country, which was being settled by English settlers, and where malaria was very bad. It is the rule we adopted in Panama. The mosquito is capable of a flight of much more than 200 yards, but that is in general

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*Read in Section on Medicine, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., November 9-12, 1914.

the distance that could be adopted in clearing and draining.

The most interesting point to me at present in tropical sanitation is the fact that, it seems to me, we are on the eve of the beginning of a great change in the habitat of the white race. I think we are on the eve of settling and inhabiting the tropics that it will rapidly become known that the white man can go into the tropics and live and protect himself, and the superior productivity of the tropics will rapidly attract him; that the great tropical valleys of the Amazon, and of the Congo in Africa will produce food for all present inhabitants of the world, if they were settled by such a class of people as the Anglo-Saxon population that at present occupies the United States. It seems to me that the social conditions of the world are at the point of a great change, as is illustrated by the great European war which is going on, and which is bound to settle one way or the other the social conditions for a long time to come.

It seems to me that our race must have at some time in the not far distant past lived in the tropics before the use of clothing and the discovery of fire by man. We could not have lived in such a climate as Virginia or Dakota as we do now. It must have been in the region of the tropics that our ancestors lived at that time. They then must have known something of the temperate regions on the borders of the tropics, gradually wandered about with the warm weather, and the individuals that were exposed to great cold must have suffered severely, and perhaps a great many of them been frozen to death. They must have at that time looked at the temperate regions of Virginia as being exceedingly unhealthy, much more so than Panama or the yellow fever regions were thirty years ago to our race.

The discovery of fire and the use of clothing by human beings must have been an enormous sanitary advance, much more important to them than our present discoveries, which enable us to occupy the tropics, and if there had been anybody who could spread such knowledge as the discovery of fire and the use of clothing, there must have been such discussions as we are going through now as to the feasibility of the individual going into the temperate and colder regions and protecting himself against unhealthy conditions of cold that then existed. That is a phase in this discussion that interests me.

It is important for us to protect ourselves against malaria in temperate zones, and we are doing it rapidly. It seems to me, with the way attention is being aroused by such discussions as we have heard here, we are going to spread very rapidly the knowledge of our ability to protect against malaria in our own country. This knowledge has spread enormously in ten years. I have been away from the United States twelve years in the tropics. When I lived in the United States we never thought of any prophylactic sanitary measures against malaria. I come back here and find not only every city, but every state, doing more or less, and I expect to see in a few years that malaria will be a much rarer disease than it is now and will hardly play a part in public medicine. (Applause.)

Dr. W. H. Deaderick, Hot Springs, Ark.—I think we are to be congratulated very much on having the Public Health Service represented and of hearing the report of Mr. Van Dine. I believe his efforts will end in giving us results of such a practical nature that they will assist us in educating the Southern farmer, the Southern planter up to the necessity of malaria prevention.

In economy as well as in malaria prophylaxis, demand must precede supply, and the only method of creating a demand for malaria prevention is through a perpetual system of education. The South African Anti-Malarial Association has realized the importance of education as a prophylactic measure by issuing a number of very attractive booklets to the public. The good state of Virginia has set us a good example by issuing at least two booklets on the prevention of malaria. These are both for the use of school children.

Ten years ago Dr. Langford, of San Antonio, Texas., initiated a movement, using the school children for the eradication of mosquitoes. I believe experiments were undertaken during the time of the yellow fever epidemic, and he almost completely rid the city of mosquitoes through the efforts of the school children.

I have enjoyed Dr. Carter's paper very much, and I trust he will continue his obervations on the impounding of waters.

Dr. W. S. Rankin, Raleigh, North Carolina: I want to say a few words with reference to the paper presented by Dr. Carter. Dr. Carter has pointed out that his paper deals with the development of an industrial problem as well as a health problem in the South. We are just beginning in the South and the Southern States to develop one of the most important of our natural resources, that is our water power, and there is an apparent conflict in the development of water power, impounding water, an industrial problem, on the one hand, and the health problem on the other. That apparent conflict has got to be adjusted.

The problem of settling the relation of artificially impounded water and the incidence of malaria is an interstate problem. It concerns South Carolina as much as Florida, and it concerns Virginia as much as Alabama. It is, as I have said, an interstate or national problem, and I think we are to be congratulated upon the fact that the United States Public Health Service has recognized the importance of this problem, and that it is particularly interesting to notice how they have set to work, as they have in the last six or eight months, to work out the solution of it. We health officers of the South should be appreciative of this, and I desire to express the appreciation of the Southern State health officers for what the Public Health Service is doing in this direction, and to further express my appreciation of the progress of the work done by Dr. Carter and his associates during the last six months.

Dr. James A. Hayne, Columbia, South Carolina: The paper I feel most interested in, having had it brought home to me, was the one by Dr. Carter on the effect of impounding of waters upon the incidence of malaria. This was brought to my attention last year by the action of the legis-

lature of South Carolina, and a joint resolution requiring the State Board of Health to determine whether the health of the community on the banks of the Broad River, whose waters had been impounded, was hurt by the impounding of that water. Of course, I immediately turned to my text-books, looked through the reports on public health and everything I could find, and found nothing that I could go by, and nothing that I could feel and express as my own opinion. Therefore I was nonplussed, and felt very grateful for the fact that the United States Public Health Service at that time had sent Dr. Carter and others with him to the state for the purpose of studying malarial conditions, and I asked Dr. Carter if he would not go with the State Board to this pond and make an inspection. We made this inspection and we found that, as Dr. Carter brought out owing to the impounding of waters breeding places were moved nearer to the residential sections. In other words, in the one hundred and fifty years South Carolina has been settled along that river the people had found by experience they could live comfortably and have no malaria on a ridge which ran on the other side of the river, which was situated at that time about a mile or a mile and a half from the river. The pond was brought within one-quarter of a mile of the old residential portions of the country. These people began to complain of a tremendous plague of mosquitoes of all kinds, not only the anopheles but culex irritans. We went up there and we found in one residence in which there was no malaria, and in which the people did not complain of malaria, there were about twenty or twenty-five of the adult anopheles mosquitoes, in broad daylight, on the porches of the houses and stables. This house was screened. When we set the screen we failed to specify. Twelve mesh screen will not keep out mosquitoes. It will keep out flies but not mosquitoes, and we adopted the slogan, "Screen your houses," but neglected to say, "Screen against mosquitoes and against flies." This house was clean, and the anopheles mosquitoes screened were inside the screened house. Since that time I had the opportunity of keeping up with that section, and I had a report from a physician practicing along that portion of the country reporting one hundred and seventy-five cases of malaria in a very small area, reporting fifteen cases on one small plantation on which there were about twenty-five people.

We will report to the legislature probably in regard to this. We also will have to take the witness stand in about four hundred suits for damages that are being brought by these people against the owners of the pond for having created these conditions and made their good land and their homes uninhabitable.

Dr. W. E. Driver, Norfolk, Virginia: I have only a few words to add to this discussion. I would like to focus your attention on the work done by two men, that of Koch in Africa and of Celli in Italy.

The work of Koch in Africa demonstrated that in a given village infected with malaria, once the inhabitants are disinfected of malaria and enough time has elapsed for the malaria mosquitoes to die out, there will be no further infections by anopheles mosquitoes. They become harmless. This must be borne in mind when dealing with malaria on the southern seaboard.

The other point is, the experience of Celli in Italy. Given a farm to work, to make the farm productive you must have water, and if you have water you have mosquitoes. Celli had for several years attempted to disinfect Italy of malaria by screening, drainage, insecticide, etc., but he was only able to bring down the mortality to seventeen per cent. When he added Koch's experience and began a systematic wholesale distribution of quinine as a prophylactic measure, mortality from malaria in a short time fell to less than two per cent. In other words, it is far more practical to get rid of malaria than it is to get rid of the mosquito.

When one takes a bird's-eye view of the southern seaboard and sees along the coast an elevation for a mile to a mile and a half inward, the bad drainage is easily accounted for. There is a natural impounding of water from Cape Henry many miles down the coast. The ponds, lakes and bays of slightly brackish water make exceptionally good breeding places for mosquitoes. Take, for instance, in my own city, we have impounded water composed of a series of lakes for our water supply, and in the vicinity of these lakes malaria is indigenous. So gigantic and extensive are the breeding places of the malaria mosquitoes that it seems quite within reason to expect the mosquitoes to be with us for a long time. On the other hand, we can largely do away with malaria if we educate the public as to the cause of this disease and the method of warfare.

I want to emphasize what General Gorgas has just said: "We must educate the farmers as to the methods of contracting malaria and the habits of the malaria mosquito before we can go very far to eradicate this disease."

Dr. Fred J. Mayer, Opelousas, La.: As was so admirably phrased by General Gorgas, as a result of this barbarous and inhuman war now convulsing Europe, the tide of immigration that will set in the moment transportation is available, will flow "Toward the tropics and the sub-tropical regions"; therefore, if we of the South are to get the benefit of this Celto-Germanic type of immigration, confessedly, the most desirable, we must put our house in order, not only in preventing soil pollution, in improving drainage and in reclaiming waste water places, but in regulating the impounding of waters, and we are fortunate in having so able and industrious an investigator and original thinker as Dr. Carter to take this matter up.

In Louisiana and Mississippi thousands of acres of long-leaf pine that before the invasion of the saw mills were healthy, having all the natural advantages of climate, sylvan beauty, mineral springs, etc., requisite and necessary to establish sanitaria and sanatoria are now malarious by reason of impounded waters. When it comes to the rice districts of south Louisiana (and doubtless the same conditions obtain in southeast Texas) we have another story: As a result of the low price of cotton a couple of decades ago the culture of rice was attempted on the broad and fertile prairies of southwestern Louisiana,

its culture up to that time having been confined to the river bottoms where water could easily be syphoned for irrigation, but it was found feasible and comparatively inexpensive to institute irrigation canals or aqueducts for the conveyance of river water and the water from deep wells, to be found in inexhaustible quantities at a depth of from one to three hundred feet. When these irrigation plants commenced to multiply reticulating the prairies with their laterals the thoughtful hygienist looked with grave apprehension on the sanitary future of the rice districts and believed that laws should have been enacted as in the rice districts of Europe, inhibiting the growing of rice near towns; but it was suggested at the time, and the theory has been borne out by practical experience, that these prairies are malarious in spots; that is to say, wherever ponds had formed or "Viviers," or reservoirs, had been dug in back yards and hog lots approximating jungle conditions, that these fertile grounds for breeding mosquitoes had been rendered healthy by the substitution of running for stagnant water; in so far as top feeding minnows and other natural enemies of mosquito larvae were concerned, they were found in both, the difference in favor of the irrigating canal lying in its clean-cut banks and moving water instead of the ragged edge of the pond, creating thousands of stagnant pools swarming with mosquito life.

A very erroneous impression exists both on this and the other side of the great herring pond about health conditions in Louisiana, where it is imagined that the state is a vast coastal plain extending from the Mexico Gulf to the Arkansas line; that this region is composed of sea marsh, swamps and sluggish bayous sweltering under a tropical heat, unfit for human habitation, and that there the basso profondo of the saurian croaks to the mezzo soprano of the anopheline and the high falsetto of the stegomyial in a horrid symphony of morbidity and death. (Laughter and applause.) This, of course, is a pipe dream that would be laughable had it not inhibited the agricultural development of the state and deflected the tide of immigration to the less favored regions of the west and to Canada. What are the facts? That there is no section of the world, of equal fertility, as healthy as Louisiana. Of course it is not meant that some mountain or seaside health resort, barren of vegetation, is not as healthy or healthier; reference is had to fertile communities in the temperate zone. When it comes to summer heat the southern portion of Louisiana has a cooler summer temperature than most localities in the United States under a two thousand feet elevation. All of this does not mean, however, a total absence of malaria, which exists in spots as a result of gross sanitary laches, that can be remedied by drainage. Dr. Carter will doubtless bear out the assertion that along the coastal plains and its sea marshes, and even the delta of the Mississippi, which approximates the physical conditions of the deadly delta of the Ganges, there is comparatively little malaria, by reason of the fact that the untold millions of mosquitoes that breed there are of the solicitans tribe and not of the anopholine family, while the corrective influences of the balmy salt air modify other morbific conditions. Here, then, are two conditions, one in the pine hills and the other on the coastal prairies, where the impounded waters present two conditions diametrically opposite. In the former non-malarial localities were made malarious; in the latter, malarious localities rendered healthier by substituting running water for stagnant ponds; so the question of the impounding of water ought to be fully discussed at this and future meetings of this body, and at all other medical and sanitary conventions, to the end that the public may be educated in the methods of prevention of malaria. There is not a spot in Louisiana, and for that matter, in the entire southern country, but that can be rendered non-malarious by the prophylactic use of quinia and by drainage even in restricted areas, say four square miles around the villages or towns, as anophelines rarely travel greater distances. If the community of interests involved would only get together and drain an area of four square miles regulating impounded waters in accordance with sanitary principles, every such community in Louisiana now malarious can be made not only salubrious, but suitable for health resorts for those who wish to escape the summer heat of the North and the rigors of its winters.

The impoundation of waters has, therefore, an enormous economic and sanitary import.

Dr. F. A. Coward, Columbia, South Carolina: The most important question raised in connection with this whole discussion is the impounding of waters. The South right now is demanding power, and in spite of the low price of cotton we are facing an era of unparalleled prosperity. We are having hydraulic plants developed, and it is going to concern us because the men who are interested in these works are going to be in our legislatures. It must affect our appropriations for public health work. We want authoritative statements. We have not the money; we cannot get the money without such statements. I think the paper should be published in full in the lay press.

Dr. D. M. Molloy, U. S. Public Health Service, Mobile, Ala.: Many interesting problems have been brought out in these various papers, but the prevention and treatment of malaria precludes the possibility of discussing all of them, and I shall confine my remarks to the discussion of the very excellent paper read by Dr. Wright.

Since Bachelle introduced the intravenous use of quinine in the treatment of malaria, in 1890, this method has been lost sight of and has been used less than any other of the valuable methods we have had at our command (perhaps known to modern medicine. To a certain extent the recrudescence of this method is due to some of my efforts while on the staff of the Philippine General Hospital in Manila. Previously I was in charge of the hospital of Bolbert Prison, where I began the intravenous use of quinine in the treatment of the pernicious types of malaria, because the cases came into that hospital and the general hospital from the various sections surrounding Manila. Some work was done at first to determine the effects of various solutions of quinine and various salts of quinine on the blood by testing out each of the salts in varying dilutions and by dropping blood into these to see what dilution would completely coagulate the

blood, and the salt was the quinine urea, it being one of the most soluble and active salts we know and had at our command at that time. We began the use of this salt intravenously in 1909, in the treatment of the pernicious types of malaria which came in occasionally, and we had excellent results. We treated a large number of cases and soon began the use of this method in the treatment of nearly all of our cases of estivo-autumnal malaria. We know the most pernicious types occur in estivo-autumnal infections. The satisfactory explanation which Dr. Bass has given of this phenomenon is one which is known to all of you, and we extended this treatment to the estivo-autumnal cases.

In 1911, in personal correspondence with the representatives of the Ancon Hospital, I told them of the results of our use of this method, and they began the use of quinine urea intravenously, but used afterwards the bi-hydro-chlorate obtained from one of the French chemical firms. One of the most striking things with this method was the very excellent and rapid results which we got in the treatment of these cases and the extremely few ill-effects that followed its use. I can bear Dr. Wright out in his statement that so few ill-effects follow the use of this treatment that it ought to be more generally employed. It is a simple procedure, and one general practitioners can use at the bedside and save many lives in the treatment of the pernicious types of malaria, and it should be more generally used.

Dr. H. R. Carter, U. S. Public Health Service: I want to emphasize one point about the intravenous injection of quinine. We used it freely at Ancon, from which indirectly Dr. Wright got his information through a paper by James, who quoted a letter from Dr. Malloy and a paper of McGilchrist. If you use a fairly strong solution, five, or even two per cent quinine, it mixes with blood serum, making a more or less insoluble jelly, which will not pass through the capillaries well. Once at Colon, after using it in strong solution, I saw vision absolutely destroyed for a little while. The man became perfectly blind in one eye, in the other imperfectly, for six weeks. Used diluted, say two-thirds of one per cent, I never saw any harm from it whatever. We give larger doses than Dr. Wright gives. We gave two to three grams, and have rarely given it more than twice.

Let me say one word on the paper of Dr. Bass with reference to malaria carriers. I had the malarial blood index taken at the Electric Mills, Miss., before there was any flight of the mosquitoes to find what proportion of carriers that go through the winter still had parasites in the cutaneous circulation. We found that 12.90 per cent of the people at that time carrying plasmodium.

I doubt if quinine sterilization can be carried out on a large scale in a community of the United States in the people who do not know themselves to be sick. One investigator failed in the German colony in East Africa because he had too many people to look after, and the Germans are a more "bidable" people than we are.

There is, however, a place for sterilization by quinine in the temperate zone. I wrote a memorandum advocating this some years ago and thought it was original with me, but find that Dempwolf had preceded me in the idea but had not elaborated it. It depends upon the question of whether the plasmodia that go through the winter, the **sled parasites,** so to speak, for the next summer, hibernate in the mosquito or in the human host. We know they hibernate freely in the human host. Do they hibernate in the mosquito? According to Henson, they perish when the temperature falls below sixty degrees. I sent to the Surgeon-General's library and got a copy of the Vienna medical journal, in which an author, Jansco, showed by experiments that there was a **cessation of development** of the plasmodia when the temperature was lowered to 46½ degrees F. Some of them are found to be degenerated, while others on being incubated go on to full development and were not destroyed at that degree of temperature. We have arranged with Dr. Von Esdorf to carry that experiment to an end this winter if possible; if not, next winter, the **seed parasites,** so to speak, for we find that the plasmodium does not hibernate in the mosquito, then it is up to us to find some method of freeing the human host of this plasmodium during the so-called closed season of anopheles. I mean in the period between their autumn and spring flights.

Mr. D. L. Van Dine, Washington, D. C. (closing the discussion on his part): I will take a few minutes, if I may be allowed, to mention a comparative study on malarial mosquitoes made in southern Arkansas this past summer by Mr. James K. Thibault, Jr., of Scott, Ark., a brother of Doctor H. Thibault, of that place. I have his short report here to present with my own paper and would ask you to give the same your consideration. There are some comparative figures and many interesting points in this paper which my time will not allow me to mention, and I can only refer to one or two briefly.

The spring was long and cold and the summer was unusually dry, therefore, there were very few malarial mosquitoes and, in turn, very few cases of malaria. Considered in relation to temperature and rainfall the forms of the disease which appeared are interesting. The records show a large increase of estivo-autumnal malaria over the tertian form, whereas in a normal season the tertian far outnumber the estivo-autumnal.

Dr. C. C. Bass, New Orleans (closing the discussion on his part,: It is indeed a great pleasure to hear of some of the pioneer work of Dr. Carter on this one of our important tropical diseases. Many of us recall the very valuable pioneer work he did on another tropical disease, and for these things we should give him full credit and our appreciation.

With regard to malaria carriers, or men carrying malaria over from season to season, and whether hibernating mosquitoes carry it over from season to season, that question should be and will be worked out in the future. Man must be a very important factor in carrying the disease over from year to year, and therefore disinfection of man during the winter would lead to very valuable results. If we can destroy the malaria plasmodium in man or in hibernating mosquitoes the results would warrant our doing so. We know

that a large per cent of men carry malaria over between seasons. We know also, and I believe it is generally accepted to be a fact, that comparatively, only a small per cent of mosquitoes are able to hibernate and live through the winter. In the spring we have not very many that have succeeded in going through the hibernating period. Presuming a number of them may be able to carry malaria with them, we would have a small source of infection. The source of infection, or the carrying of malaria over from season to season and perpetuating the species is man, and not mosquitoes; and the destruction of the organism must be attacked largely, at least, in man. The immunity that results from a previous attack of malaria is a very important factor in producing these malaria carriers or persons capable of being malaria carriers. Let us compare this disease with Texas fever, or cattle tick fever, a disease of cattle caused by an organism similar to the plasmodium of malaria. It lives in the red blood cells of the animal and reproduces in the same manner; and an animal, if inoculated or infected during the early month of its life, acquires a certain amount of immunity. It may be reinfected by ticks and live without developing the destructive form of the disease. If it escapes immunization during the earlier period of its life, it is very susceptible to the disease, and a large per cent of those infected die. An immunized cow is capable of being infected and transmitting infection as long as it lives in an infected area of the country and is continually reinfected, but it does not develop the severe form of the disease itself. We can take the blood of such an animal and inoculate it either directly into a susceptible animal or indirectly from ticks and transmit the disease, but if we transfer the animal for a number of months to a non-tick pasture, then it loses its capacity to infect and retains its immunity during life. It is probable that the same thing occurs to a great extent in man. It can hardly be questioned that there is a considerable amount of immunity acquired by men who have been born and raised in a malarial section. They are still capable of being malaria carriers as long as they are repeatedly reinfected by infected mosquitoes; that a number of such people, sick perhaps only once in a while, and many others not sick, are a constant source of reinfection for one another and to others and that is how the disease persists. Disinfection of such individuals would be a matter of extreme importance, and if we can educate people to disinfect themselves when they have malaria, we would not have to fight mosquitoes to prevent the disease. Not only does it require the anopheles mosquito, but it requires also malaria to transmit malaria from man to man. It matters not how many mosquitoes were present, if we did not have malaria we would not have malaria transmitted. It is important that in connection with any drainage project and education against mosquitoes we should also educate our people how to cure malaria and how to prevent it. The screening of houses and draining of lands will cost a lot of money, but quinine costs comparatively little. I simply want to emphasize the importance of disinfection of malaria carriers. It is probably of paramount importance for early results.

I should like to suggest that the impounding of waters, as Dr. Carter has so excellently brought out, may be an important source of increase of malaria, or may be a source of decrease of malaria. It is quite within the bounds of reason to require that where waters are impounded by large corporations it should be done in a manner not likely to increase mosquito breeding. The cost should be very small.

Dr. H. R. Carter, U. S. Public Health Service (closing the discussion on his part): This survey must be a survey of normal river valley, and it had best be done before the pond is made. Where a pond is already made this is impossible. What we did in place of that in such a case was to go half a mile below the pond and take a section of the river valley a mile long below that on both sides of the river. Then we went half a mile above backwater and took a section a mile long above that. Those portions of the river valley above or below the pond are not affected by the pond and show what the river valley was before the pond was made. Also, as we got away from the pond level, in the country above backwater, to see what this country was like above pond level, we got a fair idea of the river valley before the pond was made. The survey of the pond is no small matter. At Blewett's Falls we spent sixteen days in July and sixteen days in September upon the pond alone. The pond must be surveyed at different times of the year; at different stages of water; and, for a new pond especially, in different years. When a pond is first made it has an entirely different condition from what it has two or three years afterward. A new pond should be surveyed once a year for the first three years, and then wait five years longer and survey it again.

I do not regard it as an interstate problem unless a pond runs into two states, but it is a problem worth attending to by the county, the state, the United States, or anybody else. It should take five years longer on this work before you could have data sufficient to justify more or less accurate formulation of the general findings. I am sure, that while each separate pond will be more or less of a problem in itself, yet there will be a mass of general findings all more or less applicable to ponds as such. That is the way with everything in nature. You find something that applies to the whole thing, like pneumonia, and certain treatments will apply to the man who has pneumonia. The object is not simply to find out how it affects the incidence of malaria but how **to reduce to a minimum its ill effects in producing malaria and increasing the maximum good effect in preventing malaria.** Ponds do both. They prevent malaria and make it. We must consider both factors, plus and minus, and make efforts to reduce malaria to a minimum and prevent malaria from developing to the maximum. That is the ultimate object of the work I was engaged in last summer, and if I am not too old I shall follow it for the next five years.

Dr. T. E. Wright, Monroe, Louisiana (closing the discussion): It is unfortunate that the Section on Medicine has so far encroached upon the Section of Public Health that we are looking for the public health feature of nearly every subject

under discussion. Dr. Malloy's experience has been sufficient to entitle him to a keen insight into the subject. I appreciate his favorable discussion.

The advent of salvarsan into this country and its almost universal use has made it imperative that the average practitioner acquaint himself with the technique of intravenous therapy. This situation is very promising when we consider the outlook for a more general use of quinine intravenously in malaria.

One feature of the treatment I desire especially to mention here: Expensive and complicated material is not only superfluous, but will interfere many times in the decision of the physician to administer the treatment. One experience coming a few weeks ago I believe is permissible here: A patient was found with all evidences of pernicious malaria, blood examination having been made a few hours previously showed many plasmodia. With an ordinary fountain syringe, a salvarsan needle, a bottle of quinine tablets, some absorbent cotton, nearly all of which one of the physicians had in his car, an intravenous treatment with quinine was administered. River water was used, having been double filtered through cotton, boiling before and after. As mentioned in the paper, when the solution is made up of water not freshly distilled we can expect a reaction. In this case the reaction was rather severe, but the patient's temperature was normal within twelve hours, and the delirium had completely cleared up.

In closing this discussion I am especially desirous of impressing the average practitioner with the importance of this method of treatment, especially in the pernicious cases. A careless doctor, without attention to detail, especially with reference to asepsis, should not attempt this method. The usual average care in working out and handling any method, as we usually put into our cases, is sufficient, and yet the method is not without its dangers in the hands of a careless and incompetent man.

As I have mentioned in my paper, there are many things yet to be worked out. Among these we find such unsettled questions as the best possible dilution to make. I have used to date only very dilute solutions, fifteen grains in 250 to 300 cc. of saline. It is not claimed that this dilution is the best. Other men have given much more concentrated solutions even down to a one to twelve or fourteen. Possibly a most convenient and probably safe dilution would be to give ten grains in a 20 cc. syringe. This has been given without bad results. Just whether its effect is better than a higher dilution cannot at present be claimed. Certainly the convenience in administration by this method is distinctly to its credit. Another point yet to be settled is the number of treatments necessary to effect a cure in a given case, and for the different types, and for the varying degrees of severity in each type. These questions along with many others can be worked out, and I believe we can be safe in saying these problems will be worked out by the men in the South if they will give sufficient time and attention to detail in their study of malaria.

When you have a serious case of malaria, so serious that one dose of quinine may be a deciding factor in the treatment, I would suggest that you try this plan, using the best method you can work out with whatever safe material is at hand, watching the result carefully. I think you will give another treatment soon afterwards.

THE ORGANISM PROBABLY CAUSING PELLAGRA.

By T. E. Sanders, M.D.,
City Health Officer, Hot Springs, Ark.

On July 14, 1914, I withdrew the spinal fluid from a pellagrin, who had died one hour previous from a violent case of pellagra, exhibiting marked cerebral symptoms. I took all the aseptic precautions that I could. Part of the fluid I examined and the other part I incubated. The part that I examined showed a very few organisms that appeared to be oval in shape and the periphery stained more intensely than the center with Giemsa stain. The other part of the spinal fluid was incubated for about a week before it showed any apparent growth. I made a smear and found it to be the same organism. I made a transfer from the growth in the spinal fluid to Agar-Bouillon and Loeffler's Blood Serum. There was no growth on the Agar-Bouillon, but it grew on the blood serum. I kept the growth alive on blood serum by transplanting for quite a while then it finally died out. I did not report it publicly for fear that the culture might possibly have been from contamination.

On July 31, 1914, a similar case presented itself and I went through the same routine and obtained the same organism. In both cases the organism finally died out on Loeffler's blood serum after many transplants.

On October 18, 1914, I held an autopsy on a pellagrin, who had died of a violent typhoidal type of pellagra with marked skin lesions of the wet ulcerative type. The abdominal fat was very little, if any, reduced. The

spleen was comparatively small to the pellagrin's weight. I split the spleen with a sterile knife and inoculated a special media, consisting of a saturated corn meal and agar bouillon faintly acid with hydrochloric acid. Upon culturing I obtained the same organism and it has been growing upon that special media ever since.

The growth upon that media appears as a grayish white, but a slightly darker shade than a growth of typhoid bacilli. It does not spread much on the surface of the media. It is aerobic and requires a great deal of moisture.

The organism is highly motile and seems to pass through a definite cycle of some kind. It is characterized by a multiplicity of forms changing from a small oval cell-like form to small bacilli, thread-like bodies, and comparatively large bacilli. Most anyone upon first examination would naturally think that it was an impure or contaminated culture. Every day it appears different but appears to come back to the same forms. I have been growing it for over four months and the growth appears the same as when it started. It seems reasonable that if it was an impure or contaminated culture one form would have outgrown and killed out the other.

After becoming familiar with the different forms of the organism I began to study a large number of fecal smears that I had gathered from pellagrins in the diarrheal stage of the disease and found that they contained large quantities of the same organism.

About the first of last December Mr. Harvil, a representative of Park Davis Co., requested me to let him send the culture to the P. D. Research Laboratory for investigation. It was sent and they referred it to Dr. Joseph Goldberger of the U. S. Public Health Service. Dr. Goldberger wrote me that he was sending it back as he was so busy that he did not have any spare time to make the investigation at present.

After reading Dr. B. W. Page's paper in the February issue of the SOUTHERN MEDICAL JOURNAL I am convinced that we have both isolated the same organism, although going at it in different methods.

AUTHORS' ABSTRACTS.

Tropical Diseases and Public Health.

Mosquitoes and Sewerage Disposal. By Frederick Knab and August Busch, Washington, D. C. American Journal of Tropical Diseases and Preventive Medicine, November, 1914, pp. 333-338.

Certain species of mosquitoes, particularly **Culex pipiens** and **C. quinquefasciatus,** are associates of man and multiply most rapidly in the presence of highly polluted water. The bearing of this relation on many mosquito outbreaks has not been sufficiently appreciated. The authors present a striking case in that of certain suburbs of one of our large eastern cities, where the installment of contrivances for the sanitary disposal of sewage brought with it a great mosquito invasion. The region is hilly and natural mosquito breeding places conspicuously absent. Two tanks in which the sewage is collected for bacterial reduction were the principal breeding places. In one of these the number of mosquito egg-rafts found floating was estimated at 5,000, with an average of 200 eggs each. Outside of these, mosquitoes were breeding in lesser numbers in many places, but in every case the relation to sewage was obvious. Some small streams were found to contain m squito larvae wherever they were polluted by sewage discharging into them. In such places, contrary to usual experience, the larvae occurred even in rapidly flowing water, while some distance beyond, where the water had become purified, no larvae could be found. Thus the existence of the mosquitoes is bound up in the two food supplies furnished by man, his blood for the females, his waste products for the larvae. A problem still to be solved is how to control the mosquito breeding in the tanks without inhibiting the bacterial sewage reduction process.

Pernicious Malarial Fever. By Thomas D. Coleman, Augusta, Ga. Journal of the Medical Association of Georgia, December, 1914, pp. 240-243.

Malaria has been a bar to man's progress for many centuries. It is caused by the bite of a mosquito which has bitten some one affected with malaria, and from no other source; two hosts being necessary, viz., a human being and an insect. For its prevention two procedures are necessary—draining or petrolizing pools, and isolating infected human beings.

Any of the malarial organisms may at times produce pernicious symptoms. The chief causes of pernicity, according to Bastionalli and Bignani, being due to localization of the parasites in the brain or other important organs. Most pernicious attacks occur in patients who have suffered repeatedly from malarial paroxyms that have not been treated properly: briefly, it is an acute exacerbation of a chronic process. All varieties may be adequately included under three types, viz.: (a)

The Comatose or Congestive type; (b) the Algid or Choleraic type; (c) the Haemorrhagic type. It would be extremely interesting to know just what property causes clumping of the infected corpuscles in the Congestive and Algid types in the neighborhood of the heat regulative centres; or what it is that determines the strong haemolytic action in the Haemorrhagic type.

In the treatment, quinine is the sovereign remedy in the Comatose and Algid forms, given to its physiological limit either by mouth, inunction or hypodermically. It is not of avail in many cases of the haemoglobinuric type, but on the contrary seems to increase the haemolysis and diminish the patient's chances of life, as is attested by Mauneberg, Marchiafava, Bignani, Thayer, Vedy and others.

The Use of a Microscope in the Diagnosis of Pellagra. By B. W. Page, Lumberton, N. C. American Journal of Public Health, January, 1915, pp. 57-58.

Microscopic examination of feces of a large number of pellagrins show the constant presence of a sporagenous bacillus peculiar to this disease. The spores are motile and in fresh specimens the young bacilli can be seen as they escape from the cell membrane. At first very active, they gradually elongate and become less and less motile. Later they present a beaded appearance. The bacillus is aerobic, stains readily and grows on culture medium. Lower animals do not seem to be very susceptible to the disease. Mild intestinal affection was produced in a cat and the bacillus again observed on microscopic examination. In a man pellagra has been induced by transference of cultures of the bacilli.

A few mild cases of pellagra have been relieved of symptoms and bacilli by the internal administration of ichthyol. Later investigations show that for the more advanced cases a diet as tested by Goldberger, or the diet outlined for diabetes mellitus is of wonderful assistance to the ichthyol treatment.

Analysis of Thirty-seven Fatal Cases in Which Pellagra Existed Alone or in Association with Other Diseases. By H. C. Clark, Ancon, C. Z. American Journal of Tropical Diseases and Preventive Medicine, December, 1914.

A digest of the study would indicate that pellagra does not have a high incidence on the Isthmus of Panama and that the cases have not been confned to certain localities. It has occurred almost entirely in adult West Indian negro women, yet the male inhabitants vastly outnumber the females on the isthmus. The disease has not been known to occur in children. The average stay on the isthmus of those individuals known to have had the disease was five or six years. Practically all of the women had been housewives or laundresses and had lived chiefly on a fish and vegetable diet. The disease has shown no tendency to seasonal variation. The pellagrous syndrome has shown a striking association at times with syphilis, alcoholism arterio-sclerosis, starvation and chronic pelvic inflammatory disease. The series analyzed does not clearly demonstrate that the disease is indigenous. Histological, bacteriological and inoculation observations, on the series of cases referred to, failed to indicate a causative factor. The results of the study would indicate that if pellagra is an infectious disease then some peculiar factors exist in the Panama Canal Zone which determine its incidence among the negro women imported from the West Indies.

Purity of Our Streams Should be Preserved. By Scotland G. Highland, Clarksburg, W. Va. West Virginia Medical Journal, January, 1915, pp. 224, 225.

Public health is purchasable. Within natural limitations any community can determine its own death rate. Prior to the general introduction of public water supplies the impression seems to have been that the use of rivers was to carry away sewage and refuse. The most manifest nuisances are the formation of sludge deposits in the beds and on the banks of rivers; the turbidity and color of the streams; the putrefactive changes which occur and cause bad odors; also the putrefying sludge which rises to the surface of the streams and which floats with other suspended matters. Such nuisances are so serious in some communities that it is impossible to dwell in the neighborhood of the rivers or streams. It is necessary for the people to procure water from the lakes or streams of the state, and it should never be necessary to convert sewage-laden streams into drinking water. It is now accepted as reasonable to require every town or city sewered on the water carriage system to prevent the discharge of the coarser suspended solids in the sewage into the river.

The general tendency of the large, growing towns and flourishing industries to get rid of their yearly increasing sewage by discharging it into the rivers, has imposed upon the state the duty of carefully guarding public water courses.

The far-reaching hygienic importance of keeping the rivers clean is faced by the fact that the towns and factories must be provided with means of getting rid of all these matters for which the public water courses seem to provide the natural outlet. When no other method is available permission must be granted, but with certain safeguards which preclude possibility of danger to the public health.

The Social Cankers. By O. J. Porter, Columbia. Tenn. Journal of the Tennessee State Medical Association, January, 1915, pp. 357-361.

The author discusses the duty of the medical profession to the public in the matter of the venereal diseases; brings out in non-technical language the story of gonorrhoea and syphilis; their mode of transmission, their effect on the individual, the family and the State. He shows the utter failure of past efforts to in the least diminish the prevalence of these diseases and exhibits the reasons therefor. The paper deals frankly and perhaps a bit boldly with sex morality.

The conclusion reached and emphasized with energy is that the doctrine of venereal-disease-punishment for sex immorality is, when the whole question is broadly viewed in its relation to race

welfare, a doctrine in itself highly vicious and immoral.

The author believes that considering the characteristics of the contagium of syphilis and gonorrhoea individual prophylaxis alone offers any prospect of stemming the swelling tide of these diseases and insists on the obligation of the physician to inform his clientele of the nature and gravity of the venereal diseases and to prescribe the accepted and successful means of personal prevention. He concludes as follows:

"Let us all recognize, what no sane man can question, that the highest interests of the race are best served by continual sacrifice at the altar of chastity; and that the moral salvation of mankind as regards this matter, lies in keeping within the law. But, let me emphasize, there is no inconsistency between preaching idealism with reference to sex relationship and teaching personal prophylaxis with reference to venereal disease."

Control of Habit-Forming Drugs. By C. E. Terry, Jacksonville, Fla. Journal of the Florida Medical Association, October, 1914, pp. 100-103.

The practicing physician should assume the aggressive in stamping out the evil. Physicians writing prescriptions for these drugs must send copies to the Health Department, which gives free prescriptions to indigent cases. Considerable information relating to the extent, etiology, sociology, etc., of drug addicts in Jacksonville has been obtained. About 1.5 per cent of the population are drug users, grouped by color and sex as follows:

White males	32.69%
White females	36.98%
Colored males	11.04%
Colored females	19.28%
Total males	43.74%
Total females	56.26%
Total white	69.67%
Total colored	30.33%

The white users outnumbering the black (population of city about equally divided between the races), and the women of both races outnumbering the men. Histories obtained from 250 users show the following as direct causes of the habit:

Prescriptions of physicians	48.8%
Through dissipation	30.4%
Through advice of users	18.8%
Chronic and incurable disease.	2.0%

Indirect causes in order named were rheumatism, pelvic inflammation, accidents, headaches, surgical operations, "stomach trouble," etc. About 15 per cent of users were prostitues. The influence of the druggist is seen in refilling prescriptions containing opiates and in making illegal sales over the counter.

Prohibitive legislation must take cognizance not only of the manufacturer and druggist but of the practicing physician. Free institutional treatment should be provided for those unable to pay and commitment by self or family should be arranged for.

The Midwife Problem in Virginia. By W. A. Plecker, Richmond, Va. The Old Dominion Journal of Medicine and Surgery, December, 1914, pp. 243-247.

The record of puerperal deaths in Virginia for 1913, though incomplete, owing to misleading, or no statements as to causes in many cases, show that about 150 women died from puerperal septicemia in the practice of midwives, who are mostly ignorant, dirty negro women. Many others recover only after long and severe illness. Many infants, likewise, of these mothers, died from lack of care and proper nourishment. These deaths as a rule occur through the habit of midwives in making vaginal examinations without aseptic precautions.

The remedy proposed is to secure legal enactment forbidding any midwife, without hospital training, from making vaginal examinations or to administer any drugs, except a laxative.

They should be required to register with the local registrars of vital statistics, and secure a permit from the State Board of Health, countersigned by the local registrar.

There should be a fine for making vaginal examinations, as well as for failure to report each birth.

The midwife is thus placed under the direct supervision of, and made responsible to, the local registrar, whose authority she will learn to respect in the reporting of births.

The work of educating the public by bulletins and otherwise of the danger from the dirty methods of these women should be continued and pushed.

The midwife should be furnished, as is now being done, a set of elementary rules as to her duties.

The physician should be urged as an act of humanity to respond to their calls for help in difficult cases.

MEDICINE

(INTERNAL DISEASES, PEDIATRICS, NEUROLOGY, DIAGNOSTIC METHODS, ETC.)

THE DIFFERENTIATION OF THE DISEASES ASSOCIATED WITH SPLENOMEGALY.*

By William H. Deaderick, M.D.
Hot Springs, Ark.,
Visiting Physician to the Leo N. Levi Memorial Hospital.

The splenic enlargements with which we have the most frequent dealings are not primary diseases of the organ itself, but symptomatic increases in size. They constitute one of the most interesting classes of pathologic conditions depending, as they do, upon a wide variety of causes and requiring for their differentiation the accurate application of the methods of physical examination besides those of laboratory technic.

In all cases in which splenic enlargement is suspected it is necessary to determine:

(a) Whether the tumor is of the spleen or of other origin.

(b) If of the spleen, whether it is due to hypertrophy or to displacement of the organ.

(c) If due to enlargement, what is the cause.

In determining whether the enlargement arises from the spleen or elsewhere it is necessary to consider especially tumors of the left kidney. No matter how extensive the splenic hypertrophy, the organ usually retains its lieniform contour, presenting a hard, smooth surface, a sharp edge and one or more horizontal notches. On the other hand, renal tumors recede gradually into the impalpable depths of the abdomen. The enlarged spleen protrudes from the costal margin, while tumors of the kidney tend to occupy the flank. The inflated colon passes behind the enlarged spleen, but crosses a kidney tumor, interrupting its area of dullness. Examination of the urine may throw light on doubtful cases. In some instances it may be necessary to catheterize the ureters and even to inject colloidal silver into the renal pelvis and examine pyelographically in the hands of one familiar with the technic and realizing its possible bad results.

We are not often called upon to differentiate between an enlarged spleen and a dislocated spleen of normal size, though the latter may occur as a result of left-sided pleural effusions, emphysema, pneumothorax, or neoplasms. The usual methods of palpation and percussion are ordinarily sufficient to determine whether or not it is out of its normal location.

To get at the cause of splenic enlargements often taxes the most skillful diagnostician. Some of the underlying diseases may be detected in the laboratory in a few minutes without seeing the patient, while in some cases the diagnosis must be made postmortem.

From the standpoint of frequency malaria is the most important southern disease associated with enlargement of the spleen. There are two phases of malaria in which marked splenic enlargement occurs, chronic malaria and malarial cachexia. The distinction I would make between chronic malaria and malarial cachexia is that the former is an active form of malaria, while cachexia is a sequel. Chronic malaria implies a supply of vital resistance equal to the demand; malarial cachexia denotes an exhaustion of this supply. Chronic malaria is an antagonistic equilibrium between parasite and host; cachexia is a rupture of equilibrium. Chronic malaria is a conflict; cachexia a conquest. The therapeutic

* Read in Section on Medicine, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., Nov. 9-12, 1914.

test is usually positive in chronic malaria, negative in cachexia.

In my experience parasites are rarely found at a single examination in cases of true malarial cachexia, though this is at variance with most of the text-books on the subject. An increase in the large mononuclear leucocytes is usually present in cachexia and is useful in diagnosis. In chronic malaria the parasites are found, at least, after repeated examinations, if not, indeed, at the first. A history of recent paroxysms and a large mononuclear leucocytosis are valuable criteria.

Malarial splenomegaly must be differentiated from that of splenic anemia. This latter condition is sometimes as difficult of diagnosis as it is obscure in etiology. It may well be divided into three stages: First, a stage of splenomegaly; secondly, a stage of anemia, and, thirdly, a stage comprehending the Banti syndrome, splenic enlargement, cirrhosis of the liver and ascites. In the first stage before the onset of anemia the diagnosis is very difficult. There is little impairment of the general health. Leukemia and pernicious anemia may ordinarily be eliminated by their blood pictures.

The fact that a history of malaria precedes many cases of splenic anemia causes frequent confusion of the two diseases. If opportunity is had to observe the case for even a short period, there should be no difficulty in differentiating splenic anemia from chronic malaria, but even prolonged and careful observation may fail to differentiate splenic anemia and cachexia.

Hematemesis is far commoner in splenic anemia than in malaria, and the enlargement of the liver is decidedly more marked in Banti's disease than in malaria. There is a prevailing tendency to ascribe all splenic enlargements to malaria. In memory of the confusion until recently of kala-azar with malarial cachexia we should not yet be dogmatic. Even with a positive history of past malaria its influence on the case under consideration should be carefully weighed.

The importance of differentiating enlarged spleen from kidney trouble was impressed by a case once under my observation and which had been diagnosed malarial cachexia, chiefly on the strength of a malarial history and a residence in a highly malarial locality. Exploratory laparotomy disclosed a huge sarcoma of the left kidney.

In leukemia, especially in the myeloid form, is enormous enlargement of the spleen found. There is nothing characteristic in the splenomegaly of leukemia, but fortunately the blood picture is pathognomonic and the diagnosis may be made in the laboratory without seeing the patient.

The leucocytes may number from 100,000 to 1,000,000 and consist chiefly of myelocytes and polymorphonuclears. Anemia occurs late in most cases.

In lymphatic leukemia enlargement of the glands of the groins, axillae and neck usually precedes splenic enlargement and may lead to a blood examination.

Contrasted with the kaleidoscopic blood picture of myeloid leukemia, with its varied assortment of leucocytes, that of the lymphatic form is intensely monotonous, showing for the most part lymphocytes averaging about 200,000 per cmm., while the reds average from two to four million at the first examination.

During the remarkable remissions that rarely occur in leukemia, spontaneously or as a result of certain intercurrent affections, the so-called aleukemic stage, the blood picture may be so nearly normal as not to fasten the attention of the observer, but the chances for this are minimal.

Hodgkins' disease is relatively rare, but its splenomegaly must be differentiated from that of lymphatic leukemia and of splenic anemia. The spleen is rarely enlarged greatly in Hodgkins' disease. The lympathic glands are enlarged in this order of frequency: cervical, axillary, inguinal, bronchial, mediastinal and retroperitoneal. The anemia is of the secondary type and there is no characteristic change in the leucocytes, though occasionally

there is a slight leucocytosis. Males are affected about three times as often as females. The glandular enlargement and the absence of a tendency to hemorrhage should distinguish this disease from splenic anemia and the blood picture should differentiate it from lymphatic leukemia. If necessary, a small portion of a superficial gland may be excised for pathologic examination.

In only a small per cent of cases of pernicious anemia is the spleen considerably enlarged. In one of my cases in which the hemoglobin descended to 25 per cent the spleen was not palpable nor was the area of dullness perceptibly increased. However, in the few cases in which there is much splenic enlargement, and the organ may reach the umbilicus, the blood examination should settle any doubt. The erythrocytes are ordinarily under 2,000,000, the color index high, and changes in the shape, size, morphology and staining reaction are common. The leucocytes count is normal or below. The feces should be examined for ova of intestinal parasites, and if malarial organisms are present they will be detected while making the blood examination.

Cirrhosis of the liver causes enlargement of the spleen which must be differentiated especially from that of Banti's disease. In both conditions we may meet with a cirrhotic liver, ascites, splenomegaly, jaundice, anemia and hemorrhages. The liver condition is primary in cirrhosis; in splenic anemia it is a terminal event. Splenic enlargement occurs earlier in splenic anemia and attains a greater degree. The jaundice of cirrhosis is hepatogenous as a rule; that of splenic anemia is always hematogenous until the liver becomes involved. In splenic anemia the anemia is an early and marked symptom and in many cases is entirely independent of hemorrhages. In cirrhosis the anemia follows later and is largely dependent upon hemorrhages. The toxic symptoms of cirrhosis are of importance. The hemorrhages of splenic anemia may occur long before the liver is involved. A history of syphilis or of alcoholism is suggestive of cirrhosis, but such a history confers no immunity to splenic anemia. It is often as difficult to differentiate between a hepatogenous splenomegaly and a splenogenous cirrhosis of the liver as it is to determine whether the heart lesion or the kidney lesion dominates the scene in cardio-vascular-renal disease.

In a recent case of splenomegaly with anemia, cirrhosis and ascites, the diagnostic atmosphere was considerably clouded for a while by a definite history of syphilis and the presence of hookworm ova in the feces. A Wassermann reaction and the luetin test were negative and thymol removed a very few worms. Further observation justified the conclusion that the case was probably one of Banti's disease.

Syphilis in the tertiary stage, aside from its role in hepatic cirrhosis, causes enlargement of the spleen by two processes: gummata and amyloid degeneration.

Splenic gumma may reach the size of a cocoanut and cause marked enlargement of the organ. The liver may likewise be enlarged, and splenic enlargement may be secondary to syphilitic cirrhosis of the liver.

For the differentiation of syphilitic splenomegaly the history, evidence of syphilis elsewhere and the Wassermann reaction should suffice. The discovery of the Wassermann test marks an epoch in the differentiation of splenic enlargements, and much that was written before this period must be rewritten.

Amyloid spleen is due to syphilis and to suppuration. When syphilitic it is associated particularly with bone and rectal lesions. The spleen is one of the organs, if indeed not the organ most frequently the seat of amyloid change. This condition should be suspected in the presence of adequate cause when the spleen is large, hard and smooth, with a thickened and rounded edge. Amyloid changes may be present in the liver, kidneys or intestines. The Wassermann test should be applied in suitable cases.

There are other causes of splenomegaly, for instance, erythremia, tumors, abscess and the

Gaucher type of splenic enlargement. These are among the more unusual causes, but should be borne in mind in obscure cases.

In my experience splenomegaly from all causes is rarer in the negro race than in the white. This is notwithstanding the fact that some of the diseases, particularly malaria, syphilis and tuberculosis, are common in negroes.

DISCUSSION.

Dr. J. B. McElroy, Memphis, Tenn.: Dr. Deaderick has with his usual clearness introduced an interesting subject for our consideration. The subject of splenomegaly has interested me for a considerable time. It is true, enlargement of the spleen usually presents itself below the costal border and may simulate abdominal tumors and has to be differentiated from these conditions. It must not be forgotten that sometimes splenomegaly is associated with enlargements, and may in this condition be confused with intrathoracic conditions. More especially is this true in speaking of hydatid cysts, which Dieulafoy has so graphically described. As the essayist has said, not infrequently enlargement of the spleen is associated with cases of malaria, and a clear distinction should be made between chronic malaria and malarial cachexia, which is a difference in degree rather than in kind, but I would emphasize the importance of detecting the presence of malarial splenomegaly by careful examination of the dehemoglobinized specimen of blood. There was a case in my service recently which illustrates the value of this markedly. The case was associated with a large spleen, and repeated and prolonged examinations, then a smear was taken, failed to show the presence of the malarial parasites. The dehemoglobinized specimen showed a few tertian parasites. After you have made a diagnosis of malarial splenomegaly, I am sure you cannot exclude all of the other forms or, at least, the form of splenomegaly to which the essayist has called our attention, namely that associated with splenic anemia. Not infrequently, notwithstanding the various authors, I have demonstrated as Banti himself and others have, that true splenomegaly or true splenic anemia is sometimes associated wth malarial infections. Histological examinations of the spleen in these cases show that a distinct fibrous change takes place, which may, at the same time, be associated with malarial infections, but what relationship the malaria bears to this enlargement of the spleen I am not able to say. The syndrome associated will be very readily confused with large lymphocytes and lead to the diagnosis of a possibly enlarged mononuclear increase associated with a malarial condition. In the case of Hodgkin's disease the spleen very rarely gives any disturbance or any confusion. Whether or not these cases are instances of true Hodgkin's disease associated with splenomegaly, without enlargement of the lymph glands, is a question of doubt. However, no time should be lost in making a histological examination of the glands to establish the diagnosis.

Dr. W. H. Deaderick, Hot Springs, Arkansas (closing). In my paper I simply wish to emphasize the extreme importance of studying this class of cases, and all those who are in a position to do so should add what they can to the pathological work.

REPORT OF EXPERIMENTAL WORK IN THE PREVENTION AND TREATMENT OF RABIES BY DRUGS.*

By F. A. Coward, M.D.,
Columbia, S. C.

The writer feels that some explanation is due for the submitting of this apparently valueless report—certainly it cannot be called a paper. Over a year ago, when Moon announced the results of his experiments with dogs and Harris followed this with his report of an apparent cure in a developed case of rabies in man, hope sprang anew in the hearts of those who had been working against a hitherto incurable disease, and it seemed that America had given to the world one more epoch-making discovery. Inspired by the work of these men, the writer was moved to attempt verification and extension of these results, in the hope of supplanting the expensive, painful, and occasionally unsuccessful Pasteur treatment.

During the past year several workers have tried the quinine treatment without success, among others, Harris, Williams, and Biggs, in human cases, and Harris and Cumming with dogs. Our own work was uniformly unsuccessful. Briefly our experiments were as follows:

First Series. Six rabbits were given subdural inoculation of fixed virus obtained from the United States Hygienic Laboratory, this virus being the same regularly used by that laboratory and ours in the preparation of cords for the Pasteur treatment. This virus regularly pro-

*Read in Section on Medicine, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., Nov. 9-12, 1914.

duces paralysis in rabbits in from six to eight days. This series of inoculations was made at 4:30 P. M.

(a) Two of the rabbits were given 12.5 mg quinine bi-muriate, subcutaneously, two hours after the inoculation, and the same doses three times daily at four hour intervals, thereafter. At the same time, one uninoculated rabbit was given the same treatment in the same way, for control. One inoculated rabbit was given no treatment for control. All of the inoculated rabbits showed symptoms of rabies by the end of the sixth day, and were completely paralyzed and moribund on the eighth day, when they were killed. The uninoculated rabbit was apparently unaffected by the quinine, and remained well throughout.

(b) Two rabbits were given 12.5 mg. quinine, subcutaneously, once daily, beginning on the second day after inoculation. One uninoculated rabbit was given same treatment for control. Inoculated rabbits showed symptoms on sixth day, were completely paralyzed and moribund on the eighth day, control rabbit remaining well throughout.

(c) Two inoculated rabbits, untreated, showed symptoms on the sixth day. One of these was given 12.5 mg. quinine intravenously on the afternoon of the seventh day; symptoms more marked on the eighth day; intravenous injection repeated; paralysis on the ninth day, 12.5 mg quinine given intramuscularly. On the tenth day, morning and afternoon, doses of 12.5 mg quinine were given intraperitoneally. Rabbit died on the eleventh day.

Second Series. (a) Four rabbits inoculated subdurally with same virus and technique as in first series. Beginning first day after inoculation, they were given daily intravenous injections of quinine bi-muriate, .05 gm. All showed marked symptoms on seventh day, except one; this one was continued on two daily intravenous injections. All were completely paralyzed on the ninth day.

Third Series. (a) Four rabbits inoculated as in series 1 and 2. One immediately given intravenous injections of quinine. Immediate death from embolism.

(b) One given intravenous injection of neosalvarsan on the second day after inoculation, based on dosage of .9 gm for a one hundred and fifty pound human being; result—complete paralysis and death from rabies on the ninth day.

(c) One rabbit given subdural injection of quinine bi-muriate was immediately paralyzed and died on the fourth day thereatfer, death evidently due to meningeal irritation from the quinine solution.

Fourth Series. Two rabbits inoculated as above, but with street virus.

(a) One showed symptoms, marked, on the thirteenth day. Given subdural injection of .5 c.c. 1 per cent solution basic fuchsin. Complete paralysis and death on the fifteenth day

(b) One showed symptoms on fourteenth day. Given subdural injection of .5 c.c. one per cent solution trypan red. Death on following day from paralysis, evidently due to the drug.

(c) A young puppy inoculated at same time, with same street virus, and given "Koon Treatment" on third day after inoculation showed symptoms on the eleventh day; death from paralytic rabies on the thirteenth day.*

If this report of our unsuccessful labors shall prevent the useless sacrifice of laboratory animals, or spare busy men the tedium of needless repetition of such work, it may perhaps have been of some benefit after all.

DISCUSSION.

Dr. C. C. Bass, New Orleans: This is a valuable paper. It is not often that negative results are reported as the positive ones. It is such information as this that is most desirable. I happen to know of at least two other negative results. In these instances the patients died within a few minutes or a longer time after intravenous doses of quinine.

Dr. F. A. Coward, Columbia, South Carolina (closing the discussion): If Dr. Bass will look into the reports as I read them, he will see that we have not tried it on human beings. Quinine did not kill the rabbit except in one case, and in that case the injection was given subdurally. One intravenous injection produced death, but it was thought death was not due to the quinine but to faulty technic. To the rabbits we gave injections twice a day for six or seven days, and we did not kill them.

Dr. Bass: What sort of quinine did you use?

Dr. Coward: The bimuriate of quinine.

Dr. Bass: I want to make the point that a hundred grains of quinine, or even fifty, is fatal in some instances, and that it is dangerous treatment unless it is justified.

Dr. Coward: We took the maximum dose for man as being 100 grains, and estimated from that for rabbits.

*Note: The "Koon Treatment" consists of the administration of a pill of secret composition. It is widely advertised and sold in South Carolina as a preventative of rabies.

AUTHORS' ABSTRACTS.

Medicine (Internal Diseases, Pediatrics, Neurology, Diagnostic Methods, etc.)

The Interpretation of Serum Reactions. By J. H. Black, Dallas, Texas. Texas Medical News, December, 1914, pp. 201-205.

Granting that a serum reaction has been done properly by a competent serologist, the interpretation of his report is a matter of considerable importance. Laboratory reports are seldom capable of definitely establishing a diagnosis but must be taken in conjunction with the clinical findings. In serum work we are dealing with substances whose definite character we do not know, and variations in their characteristics which we do not detect may lead to variable results. In regard to specific reactions:

Vaccine prophylaxis and treatment of typhoid cause agglutinins to be formed and a positive Widal is valueless after their use. The paratyphoids are found more frequently than is generally believed, hence these organisms should also be used for agglutination reactions.

A positive Wassermann reaction generally means a syphilitic infection. A negative reaction means little. The report should be always considered in the light of the clinical findings. Spinal fluid examinations are more valuable in latent and nervous system involvements. Active treatment obscures the serologic picture even though the patient may not be cured. Provocative treatment may bring out a previously obscure finding. Alcohol prevents fixation.

Complement fixation is of considerable value in the diagnosis and prognosis of chronic gonococcal infections. It is subject to the same interpretation as the Wassermann.

The determination of protein excess in the spinal fluid is of much value in differentiating general paresis, cerebro-spinal syphilis, etc

The specificity of Abderhalden's protective ferments is questioned and the value of this work still doubtful.

Clinical and Experimental Studies Upon the Injection of Alcohol Into the Gasserian Ganglion for the Relief of Trigeminal Neuralgia (Illustrated.) By Charles Metcalfe Byrnes, Baltimore, Md. Bulletin of Johns Hopkins Hospital, January, 1915, pp. 1-10.

After five years' experience with deep neural injections in the treatment of tic douloureux, Byrnes adopted intraganglionic injections, with the hope of securing more lasting relief.

He reviews the methods by which chemical substances have been injected into the Gasserian ganglion, and gives an illustration of an instrument he has devised, which has enabled him to locate the foramen ovale with greater accuracy, thus simplifying the technique of ganglion injections.

In Byrnes' fourteen cases treated by this method the clinical results have been most satisfactory. One case, in which the patient continued to suffer for five years after surgical removal of the ganglion, is of special interest, since immediate relief was afforded by one injection of alcohol into the ganglionic fossa.

The second part of the paper is concerned with experimental injection of the ganglion. The excellent illustrations of the histological changes following these experiments will be more instructive than the brief description which could be given in this limited space.

From clinical and experimental studies, the author makes several important conclusions: The treatment itself is not unduly painful; an anesthetic is not required, and a single successful injection is followed by immediate relief of pain, and all the symptoms indicative of complete removal of the ganglion. No fatalities have been reported. While experimental evidence would indicate that the ganglion can be permanently destroyed by a single injection, the author is of the opinion that permanent relief may be obtained from repeated injections.

Enteroptosis (Glenard's Disease). By O. Lerch, New Orleans, La. New York Medical Journal, December 19, 1914.

Lerch calls attention to frequency of this anomaly, its serious character as basis of organic disease. If the pathologists do not agree to this it is because in cases examined post-mortem the abdominal organs and the heart have returned to normal position. He concludes that enteroptosis is due to form of spine and describes two types, one tall, slender, with an almost straight spine, and the other short and stout, with excessive lumbar curve. Both types are characterized by the symptoms of hysteria, neurasthenia, and visceral neuroses, caused by circulatory disturbances —too much blood in the abdomen, not enough in the upper portion of body. The symptoms of the mental and visceral neuroses, the entire absence of an explanatory pathology for any one of them, the heredity that can be traced through generations, its enormous frequency in both sexes, prevalence in women, the beginning of marked symptoms of pain and suffering at the time of puberty and of the menopause, their great variety and constant change, their occurrence in childhood, their increase during the time of menstruation, and their direct cause; overwork, worry, trauma, and child birth, are features common to the neuroses and to enteroptosis, suggesting that enteroptosis and the neuroses are one and the same diseases, as claimed by Glenard after an examination of 3,000 patients. Glenard relied mainly on palpation. Lerch, from study of 2,700 cases, relies on his method of drop percussion, which enabled him to percuss the thymus, the large vessels and the kidneys, and to show thymus is always enlarged, and distended with blood in asthma, common in enteroptosis, and small in the obese.

The Microscopy of the Urinary Sediments in Life Insurance Examinations. By W. F. Thomson, Beaumont, Texas. Texas State Journal of Medicine, October, 1914, pp. 232, 233.

From the standpoint of insurance, it is a serious mistake to disregard the presence of small, hyaline casts in the urinary sediment, even when albumen cannot be detected by the usual chemical

means; for, as Purdy says, "They are often the chief evidence, so far as the urine is concerned, of the existence of a most serious form of renal disease—interstitial nephritis."

I am quite convinced that no examination of the urine, made for the purpose of eliminating undesirable insurance risks, is complete without a microscopical examination of the urinary sediment. The presence of casts, red blood cells or leucocytes in the urinary sediment of insurance applicants, are open expressions of existing pathological lesions. Such lesions may be serious or slight, permanent or transient, but lesions they are, and such evidence certainly warrants postponement of acceptance on the part of the medical examiner until he has, by repeated examination, ascertained definitely the location and character of the lesion and its effect upon the risk.

Conclusions.

1. The usual chemical uranalysis employed in making insurance examinations may show normal findings and fail to detect the presence of very important evidence of existing organic renal disease, in the urinary sediment.

2. Casts, and especially the more common hyaline casts, are albuminous products and have either been preceded or will be followed by an appreciable albuminuria.

3. The presence of casts, red blood cells and leucocytes in the urinary sediment, are direct evidences of pathological processes of the urinary system and cannot be ignored by the insurance examiner, unless these evidences are proven not to be serious or permanent.

Some New and Old Facts on Nephritis and a Review of Its Treatment. By H. E. Jones, Roanoke, Va. Virginia Medical Semi-Monthly, January 8, 1915, pp. 475-480.

The three structures in the kidney, tubular, glomerular and vascular, when diseased, singly or combined, give four types of nephritis, each requiring different treatment, viz: (1) Tubular; (2) Glomerular; (3) Vascular; (4) Combined tubular and glomerular. Hence importance of early diagnosis. While enough cells to sustain life still functionate the prognosis is favorable. Sick cells can be restored in from a few weeks to several years. Tenderness one side of tenth dorsal vertebra indicates disease of one kidney. Both sides means both kidneys. Tenderness of lower dorsal and two upper lumbar vertebrae indicates that ureter and bladder are involved. Areas of tenderness along whole length of spine should be sought by palpation and percussion. Treatment is to remove the toxaemia by free use of alkalies. Daily concussion in all types nephritis with plexi-meter or vibrator each side tenth dorsal vertebra. An occasional intravenous injection of bichloride of mercury, one-quarter to one-half grain for adults, for meeting infection, recommended, and daily urinary antiseptics. Electricity, galvanic and high frequency, used every other day. Solar light and blue light over kidneys alternate days. Also nude body in electric light cabinet ten minutes to induce perspiration, continued by bed and blankets. Purgatives, diuretics and diaphoretics as needed. Non-toxic diet. If there is ptosis of viscera or an incompetent ileo-cecal valve, the errors should be corrected. Vibratory concussion is used over kidneys. Dessicated thyroid is also used, and the use of alkalies especially urged. Physical rest is essential.

Ataxic Types of Polyneuritis Resembling Tabes. By E. M. Hummel, New Orleans, La. New Orleans Medical and Surgical Journal, January, 1915, pp. 624-627.

The writer in this article deals with those particular types of toxic neuritis affecting chiefly the legs, and involving the sensory fibers of the peripheral nerves in a peculiar selective way, producing as a result ataxia, chiefly. It is further assumed that the sensory nerves subserving joint and muscle sensation are specially affected. The chief purpose of this essay is to draw attention to the close resemblance of this type of neuritis to tabes. It is obvious that confusion of these two diseases must be avoided and to obviate most embarrassing prognostic errors a parallel between the symptoms of tabes and neuritis is drawn and several helpful points are cited which might assist in the distinction between the two conditions. Certain observations of the writer are added.

Clinical Aspects of Carbohydrate Metabolism. By Louis Hamman, Baltimore, Md. Kentucky Medical Journal, January 15, 1915, pp. 78-85.

After a brief review of the general features of carbohydrate metabolism, the author considers in some detail the relation of the various endocrine glands to carbohydrate metabolism. While the pancreas is the dominating organ it is pointed out that the chromaffin tissue, the hypophysis, the thyroid and the parathyroids all take a part in regulating carbohydrate metabolism. The characteristic feature of true diabetes, as it is of the diabetes following removal of the pancreas in the dog, is the inability of the tissues to utilize sugar. In all other forms of hyperglucemia a large amount of the excess sugar is burned in the tissues. The author points out that the occurrence of sugar in the urine alone does not constitute diabetes and that particularly the occurrence of small amounts of sugar at varying intervals should lead us to review carefully all possible symptoms pointing to derangement of the endocrine glands. In like manner the occurrence of marked obesity in the absence of hyperalimentation should arouse a suspicion of disease of the endocrine glands. In all clinical studies of endocrine gland function the estimation of carbohydrate tolerance should have an important place.

(Authors' Abstracts continued on page 241.)

SURGERY, GYNECOLOGY, OBSTETRICS AND GENITO-URINARY DISEASES

OPERATIVE CORRECTION OF HARE-LIP AND CLEFT PALATE.*

By W. A. Bryan, A.M., M.D., F.A.C.S.,
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The stimulus for preparation of this paper is based upon two items which, from my observation, I assume to be facts: First, that the percentage of failures, complete or incomplete, cosmetic or functional, is exceedingly high; and second, that the distaste of operators for this class of cases is almost universal. The distaste is doubtless the result of the failures. I shall therefore attempt to point out certain factors connected with this department of plastic surgery that have contributed to the successful correction of my own cases, much more successful after experience enough had been gained to give me confidence than in the earlier operations. The cases now number more than one hundred and fifty, most of whom came to me first hand, a few second hand and thereby rendered more difficult, while a few came after they had been literally ruined so far as any correction of which one might be proud was concerned.

The correction, as intimated above, is intended to accomplish two ends, one, the functional, to restore speech, deglutition, correct breathing, intonation and articulation, in a word, for the relief of the patient; and the other, which is cosmetic, for the relief of the community in which the patient lives. Fail-

*Read in Section on Surgery, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., November 9-12, 1914.

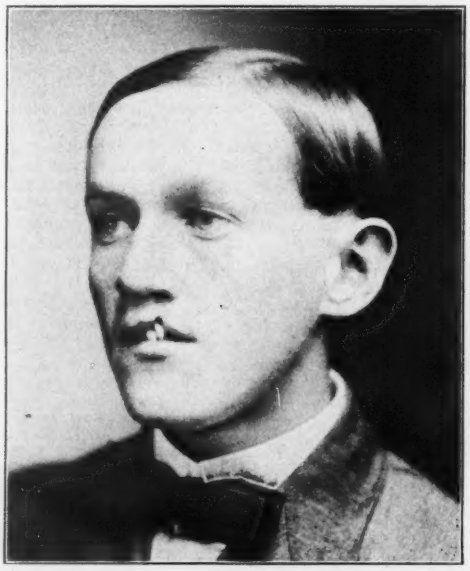


Fig. 1—Mouth prior to operation.

Fig. 2—After operation.

ure of either of these ends is necessarily unsatisfactory to all concerned, but especially to those who become acquainted with the patient only after the operation, or who have forgotten how hideous the deformity was prior to the operation.

When the surgeon has a choice of time for the operation it is better in case of harelip to correct it at the earliest possible age, from a few days to a few weeks after birth, because it will add nothing to the benefits of the operation to delay and may add somewhat to the difficulty by increasing the deformity. If the case is one of complete cleft-palate, the lip and the arch of the upper jaws should be corrected within the first three months after birth, certainly not later than the sixth month, if the best results are to be hoped for, since at this early age the bones are not so hardened that they cannot be put into position without traumatizing them with saw or chisel, and since the result is more natural in appearance than can be obtained if one waits for ossification. It is not my intention to convey the idea that the work is impossible after ossification, but it is certainly more difficult and less satisfactory. Having closed the harelip and the alveolus at this early age one will do better to wait a year or more for the closure of the hard and soft palate. This can be done earlier, even at the same sitting with the first operation, but I am positively certain that a lower mortality, a smaller percentage of failures and just as good ultimate results may be obtained by the two-time operation. And these seem to be sufficient reasons to settle the matter definitely for two operations with an interval of a year or more. The second operation, however, must not be postponed after the beginning of speech, for once the child gains his word ideas with a cleft in the palate they will remain with more or less definiteness regardless of all efforts to eliminate them, and the voice of Jacob will forever remain to tell the tale of his deformity.

It may seem trite, but it is pardonable perhaps to say in the preface that harelip and cleft palate surgery is plastic surgery and that successful results here perhaps more than anywhere else depend upon the most painstaking fidelity to the fundamental principles of plastic surgery and a mechanical turn that enables the operator to replace the tissues to normal positions without violation of these principles,

Fig. 3—Same case before operation.

Fig. 4—Same case after closing cleft.

for their violation means failure. The blood supply must be maintained sufficiently in the tissues that are to unite. The tissues must, therefore, not be traumatized, especially at the proximate edges, for dead tissues cannot heal, whether extensive or very limited in extent, and here, as scarcely anywhere else, they necessarily become infected and prevent union of uninjured adjacent surfaces. Three or four bruised points along the proximate edges of a cleft palate means unavoidable failure of union. The second elementary principle is that relaxation from mechanical or physiological tension on the flaps must be complete by

Fig. 5—Before operation.

packing, dissection or relaxation sutures to prevent muscular traction during deglutition, coughing, sneezing, crying, talking, subsequent to operation. If the line of sutures which approximate the raw edges is required to relax any tension of the flaps, failure cannot fail, and if they bind the tissues within their grasp sufficiently to impair the circulation in the least they may as well be omitted. They must approximate and that is all. Third, the edges which are to unite must be dissected back far enough to give the widest apposition of raw surfaces possible. Fourth, infection must be held down to a minimum. If one can do these things, cleft-palate surgery becomes a pleasure, otherwise it is a nightmare.

It is not necessary and there is not time to discuss the enormous details of the dissections and incisions necessary to correct harelip; so this is passed by in the hope of determining upon a choice of operation for the palate. It must do two things, viz: Close the cleft and restore function. It must not narrow the upper air passages—a cleft palate would be preferable; it must not put a functionless flap between the retracted edges of the palate, for this affords no improvement

Fig. 6—Same as Fig. 5 after operation.

of speech, the greatest end to be sought—a mechanical obturator would serve as good a purpose. It must close the hard palate and restore the soft as a live, active muscular flap to rise and fall at its owner's will, and close and open upon the isthmus between the pharynx and the naso-pharynx. One operation alone accomplishes this, namely, that of von Langenbeck, and he who can masterfully employ it in his work will be so astonished at his results that he will scarcely feel the need for improvement in the general plan as originally outlined. It is needless to describe

the operation, for it is given in all text-books covering the subject. I shall preferably call attention to certain difficulties that arise in the course of the average operation.

In the first operation, supposing the case to be complete, the lip must be dissected from its bony attachments until it can be easily approximated, even if the dissection extends to the lower margin of the orbit and the malar bone. The os incisivum must not be removed, as has been so often done by novices in the

Fig. 7.

past, but must be present to fill its normal place between the superior maxillae, and must be reduced to position by springing it back, or, if this cannot be done by pressure, then by submucous resection of a triangular portion of the vomer and fracture of the remaining pedicle. I have on one occasion had to employ a rotated segment of the vomer to replace an os incisivum that had been sacrificed by some previous operator. Now the superior maxillae are sprung into position if they may be; if not, they must be cut or sawn submucously and fractured so as to be brought into an arch, and held there by shotted wire sutures until their raw approximated surfaces unite. This first operation must correct the deformity of the nose and nostril. After proper dissection the alae nasi are drawn into position and held there by a shotted wire suture which penetrates both alae and septum. The only dressing required is the application of adhesive strips to hold the lip in relaxation until healing is complete. These strips must not come in contact with the line of sutures.

The second operation presents two important difficulties. The first is in dissecting the soft muco-periosteum completely from the

Fig. 8—Same as Fig. 7 after operation.

posterior margin of the bony palate. It is opposite this point that failure is most frequent. The attachment is dense and fibrous, but must be separated until the flaps can easily be made to overlap the midline from either side. The other difficulty lies in the fact that while it may be easy enough to approximate and suture the soft palate one can never be certain that the palate muscles will not undo the whole line of union in a few days. So the lateral attachments of the soft palate must be dissected away from their walls and pushed inward without severing the muscles, and held in position by packing gauze or relaxation sutures or tape or lead plates and shotted wires

until healing is complete. The kind of approximation sutures employed is of no consequence; what is expected of them is everything.

If I should be asked what is necessary to do successful cleft-palate work I should unhesitatingly say, "a vast amount of mechanical ingenuity, and relaxation of the tissues."

180 *Eighth Ave., N.*

DISCUSSION.

Dr. H. H. Trout, Roanoke, Va.: That is too good a paper to do without discussion. What suturing material do you use—Dr. Crile's?

Dr. Bryan: Anything—usually catgut.

Dr. Harris: The essential thing is the thorough preparation of these cases. The majority of these cleft palate cases have teeth. A great many of them have adenoids and it is very essential, in doing this work, to have a clear tract. The teeth should be removed, adenoids cleared up and the tonsils in good condition before the work is done. It is a pretty hard matter to set down any hard and fast rule, as to just how this plastic work should be done. This cannot be done unless it is done very early. Another thing, I do not see why it cannot be done before the surgeon leaves the room.

Dr. W. L. Rodman, Philadelphia, Pa.: I am sorry I cannot contribute much to this discussion because I have performed but few of these operations. I was much impressed by the paper and certainly by the results secured by Dr. Bryan, which are much superior, possibly, to any I have accomplished myself. I believe the great success in the Doctor's work is in doing what I have not done until recently, and the cause of that is that my son taught me he is operating on very young children. I think a few years ago we operated on these cases too late. I am satisfied if one would only operate earlier, particularly in the cleft palate cases, where you can twist the bones into shape, you will get better results.

I feel privileged to have been here and heard the paper, and am sorry I cannot add anything to the discussion.

I should think it very much better in such circumstances to get rid of all adenoids in cases of this kind. I would like to ask Dr. Bryan what form of anesthesia he uses in these cases, at such a tender age.

I thank you.

Dr. K. H. Aynesworth, Waco, Texas: I appreciate the fundamental principles of Dr. Bryan's paper. There are certain things enumerated by him which I do not think time will change. There are other things subject to discussion. I think the operation for harelip should be done immediately after birth, if the child's condition will permit. I have done so and heartily advise it. As to the time of operation some writers say one thing and some another. Most writers advise delay in closing the palate, especially when associated with marked clefts of the lip. Brophy has done much to clarify the situation, but I have not been able to give my consent to use his operation, especially so, when we secure such good results by other methods not so drastic. I think that if there is a cleft of the alveolus the earlier it is repaired the better it is for the patient and the more certain we are to get satisfying results later when the cleft palate is closed. I think Dr. Bryan's teaching in regard to the treatment of the projecting premaxilla is absolutely correct; rotation must not take place when the part is pushed back into proper position. If any rotation occurs the after coming teeth will not fit correctly and serious defects in position may occur. The earlier this is done, the better for the child, in every respect. I operated on a little patient about five weeks old; the projecting part was sitting directly upon the nose and when it was put into correct position and the bilateral harelip repaired the mother would not permit further operation to close the cleft palate. She was advised by her family physician that a dentist could fit an obturator that would be better. It is surprising how wide clefts of the palate will shrink when the projecting premaxilla is replaced.

In regard to the question of the voice after cleft palate operation, I think it is often due to auditory defects—the patient does not hear correctly. It has been claimed that a foreign language can be learned without the nasal twang. It requires a very intelligent mother or a very intelligent nurse to train patients after operation in order to obtain the best results. I think that one of the main reasons for early operation is to have the repair work done before speech is attempted and bad enunciation will less likely follow.

I wish to ask the Doctor how he measures the flaps in his harelip operations?

Dr. Bryan (closing): It was my purpose to call attention in this paper to the fundamental principles so essential to successful correction of hare-lip and cleft palate. Relaxation of the tissues to avoid tension on the sutured edges means everything to success. Dr. Harris suggests that the accoucheur should correct hare-lip as soon as the baby is delivered, the objection to his suggestion is that the obstetrician will rarely be sufficiently skilled in surgery to justify an attempt to correct hare-lip.

In reply to Dr. Rodman's question as to the anesthetic employed, I use ether almost invariably, regardless of the tender age of the patient. I have done successfully a major operation on a child nineteen hours old under ether anesthesia.

No measurements are made to determine the incisions made. They should be made conservatively, so that any change required will be by lengthening them. These cases vary so widely that it is impossible to lay down a rule of measurement.

It is immaterial what suture material is employed. I think the advantage lies in favor of catgut especially in the very young, inasmuch as removal of non-absorbable sutures is not easy from the mouths of very young children.

THE RELATION BETWEEN SURGICAL INFECTIONS OF THE GASTRO-INTESTINAL TRACT AND ASTHMA—A PRELMINARY REPORT.*

By J. S. Ullman, M.D.,
Natchez, Miss.

Asthma is so common a condition that a study of this sort hardly needs any apology. This is merely a preliminary report of a few cases that have recently come under my notice, a more comprehensive discussion of the subject being reserved for a later date. I realize that the number of cases observed is not sufficient by any means to establish the hypothesis set forth. But for some time past the rhinologist has shown that infections of the accessory sinuses and upper air passages are etiologic factors in asthma. And to my mind, as has been stated by others,[1] the condition is an anaphylactic reaction, in sensitized individuals, to certain proteins, whether endogenous or exogenous in origin.

We know that in many cases of renal diseases, and in many cases of cardiac disease with ruptured compensation, elimination is at times interrupted with consequent manifestations of toxic absorption. This in all probability explains the so-called renal and cardiac asthma. Having viewed the anaphylactic urticaria of serum disease, and cases of angio-neurotic edema and noting that in these two conditions, the response to vaso-constrictors (atropia or adrenal extract) is similar to the results from this class of drugs in asthma, may we not feel justified in assuming that we are at least dealing with similar conditions. To say the least, there is a striking similarity in this respect.

Working on the hypothesis that asthma is an anaphylactic reaction, we must now consider those cases in which we have the proteins of infecting organisms and their products. Such conditions of the alimentary canal include ulcers of the stomach and intestines, and subsequent abscess formation, infections of the gall bladder and billiary ducts, and of the liver, pancreas and appendix, as well as conditions giving rise to intestinal stasis. In this connection I find the following in the literature: "The recognition of vagotony is not difficult if one will remember that there is such a syndrome. . . . These are the gastric symptoms already given, to which must be added a few or all of the following: bradycardia, disturbance in the respiratory rythm, a tendency to bronchial asthma, etc. . . ."[2]

While such cases do not fall within the scope of this paper, I cannot refrain from mentioning in support of my contention another condition—adherent prepuce—where we have long known, empirically, that circumcision gives relief from asthma. In this class of cases the connection has always been considered a "reflex." May we not assume that here again we have an evidence of anaphylaxis, in which the absorption of some protein of the smegma furnishes the antigen.

The point of practical interest to us is the results to be obtained by the removal of the assigned cause. Being familiar with the cures in some cases and the marked improvement in others, resulting from the correction of pathological conditions, especially infections, of the upper respiratory tract, and in cases of adherent prepuce, we are led to infer, by analogy, that by preventing the absorption from the gastro-intestinal tract of those substances which act as antigens in susceptible individuals, we may relieve their asthma. In this connection I maintain that it behooves us to make a most thorough search for infections of the gastro-intestinal tract, as well as of the respiratory system. In fact, we may not feel that we have done our duty to the patient

*Read by title in Section on Surgery, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., November 9-12, 1914.

[1]Matthews, Collected Papers of Mayo Clinic, 1913, pp. 592-598.

[2]Mallory, Wm. J., Gastric Hypertony and Gastroenterostomy. Jour. A. M. A., lxii, p. 1884.

until the possibility of a focus of infection in any part of the body has been excluded.

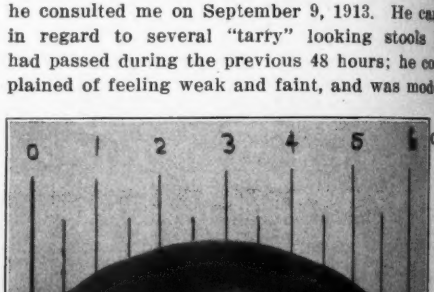
Our results, of course, will depend upon our success in removing the infection or correcting a condition causing intestinal stasis. If we are only partially successful in eradicating the offending protein we may expect only partial relief from the asthma. The condition of hyper-susceptibility remains, and in the event of a return of the pathological condition we may expect a repetition of the asthma. We may not expect a permanent cure until we have found out how to overcome the hypersusceptibility. To quote Matthews again: "Various methods of desensitizing animals have been discovered, but no method yet reported gives a lasting immunity and all are attended by high mortality. Until a safe and efficient method of desensitization is possible the treatment of asthma must be directed, as in the past, to the relief of symptoms by whatever measures are indicated in the individual case."

Brief mention of a few cases will prove of interest and serve to illustrate some of the points mentioned above.

Case 1.—H. S., white, male, age 62, married. The family history is negative, excepting that a half-sister also suffered from asthma. Tobacco is used in moderation. He formerly drank " for the relief of asthma," but quit 15 years ago. He was addicted to the use of morphine for nine years, but gave it up three years ago. There is no nephritis, cardiac disease, or tuberculosis. A Noguchi-Wassermann test was negative. There is no history of pneumonia, pleurisy or typhoid.

Twenty-one years ago circumcision and a Whitehead operation were followed by a complete cessation of asthmatic attacks for 3 1-2 years. When patient consulted me in March, 1913 he was having moderate pain in the upper right quadrant of the abdomen with each attack of asthma. A mass, somewhat larger than an English walnut, was distinctly palpable in this region. On May 15, 1913, under local anesthesia, an incision was made over this mass and a large gall-stone removed—the shape and size of which is well shown in the accompanying photograph. Complete relief from asthma followed for 21 weeks, when the attacks returned and further examination disclosed pyorrhea alveolaris. The offending teeth were extracted, and a plate made, which again put an end to the asthma for about four months. While the patient still has occasional attacks, they are quite mild and are now unaccompanied by pain of any sort. The patient has gained in weight and strength. It is also of interest to note that the occasional attacks now are apparently the result of constipation, or the absorption of the products thereof.

Case II.—B. M., white, male, age 40, married, has been a sufferer from asthma since early childhood. Family and personal histories are negative. This patient, too, had been a morphine habitue but had recently taken a "cure," when he consulted me on September 9, 1913. He came in regard to several "tarry" looking stools he had passed during the previous 48 hours; he complained of feeling weak and faint, and was moderately aenemic (haemoglobin 78 per cent). He gave a history of "chronic indigestion,' of pain, or oppression coming on about two hours after meals, or "heart-burn." The patient was told that he had a duodenal ulcer, and operation was urged. He absolutely refused to consider the question of surgical relief. He was consequently put to bed and fed per rectum until September 22. At this time I began to nourish him cautiously by mouth. The bloody stools had disappeared the second day after he was put to bed, and so far as I have been able to determine have not appeared since—nearly 14 months. The ulcer has evidently healed, if we may be guided by the fact that he had no further symptoms of his "indigestion." But the striking point is that he has had no asthmatic attacks during this time.



Gallstone removed from Case 1.

At this point I wish to mention that I have

recently seen two other cases of asthma, in one of which were symptoms of gall bladder disease, and in the other symptoms of appendicitis. Neither of these patients have as yet agreed to operation.

As stated above, the number of cases mentioned are far too few to warrant the drawing of any conclusions, but in many respects they seem to bear out the hypothesis that bronchial asthma is a manifestation of anaphylaxis.

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AUTHORS' ABSTRACTS.

Surgery, Gynecology, Obstetrics and Genito-Urinary Diseases.

Carcinoma of the Stomach: Early Diagnosis. By R. W. Knox, Houston, Texas. Texas State Journal of Medicine, October, 1914, pp. 223-225.

The difficulty of differentiation between carcinoma and several other affections of the stomach, such as chronic gastritis, some forms of appendicitis and of gall-bladder troubles, non-malignant ulcer, etc., is dwelt upon.

Two cases are described clinically and one is merely cited, to illustrate the author's position. He positively believes that there is no possibility of a non-malignant growth of chronic character suddenly changing into cancer. Most ulcers "follow a long period of indigestion and sometimes heal without operation," while "cancer is a rapid growth presenting itself suddenly, and usually without history of any previous stomach trouble." "The clinical history, as well as stomach analysis, are, at times, misleading."

Ulcer and carcinoma of the stomach may resemble each other in clinical history, gastric analysis, and even in pathological appearance, but they are distinct entities and not interchangeable. We have no means of positively identifying cancer in its early stages, although the clinical history is more reliable than stomach analysis. Taken together they are valuable. An operation before metastasis, etc., may result in relief or cure. An exploratory incision in many cases affords the only sure method of diagnosis, and perhaps of cure. The object of the paper was to elicit discussion on these points.

It was read before the Section on Surgery, State Medical Association of Texas, Houston, May 13, 1914.

Pituitary Extract in Postoperative Intestinal Stasis. By R. Duffy, Tampa, Fla. New York Medical Journal, January 9, 1915.

Duffy cites the literature for the last five years comprising over 100 cases. The various writers report very satisfactory results and seem very enthusiastic. He cautions conservatism, however, in the interpretation of these results. Most of the cases had been treated with purgatives and enemata in addition to the pituitary extract.

Duffy's own cases comprise four laparotomies in which purgatives and enemata failed to produce evacuation within seventy-two hours. The use of pituitrin was very satisfactory in these cases. In six uncomplicated cases treated with pituitrin alone, four passed flatus without stool. In two the results were unsatisfactory. He summarizes as follows:

1. Pituitary extract is an important aid in postoperative paralytic ileus.
2. It should be tried in all cases where purgatives are not retained by mouth.
3. Its effect on the peristalsis in cases with tympanites seems to be more marked than in cases with no intestinal distention.

Prostatic Abscess Opened Through the Cysto-Urethroscope with the High-Frequency Spark. By Abe Nelken, New Orleans, La. Journal of the American Medical Association, January 30, 1914, p. 431.

Nelken reports a case of abscess of the prostate complicating an acute gonorrhea, which he opened through the cysto-urethroscope by means of high-frequency cauterization.

Patient had had complete retention of urine for two days. The bulging abscess was readily recognized through the instrument and the flexible electrode was pushed against the wall. A mild current for 30 seconds was sufficient to burn through. Relief was immediate and the patient has been emptying his bladder without difficulty since. The operation caused very little discomfort, not taking, in all, over five minutes.

Quinine Salts in Post-operative Cases. Preliminary Report. By Edmond Bonnot, St. Louis, Mo. Journal of the American Medical Association, January 9, 1915, pp. 146-.

The method originated with the author in May, 1914, with the following results in twenty cases, including the various abdominal operations:

No nausea or vomiting in 10 cases.
Slight nausea and vomiting in 6 cases.
Much nausea and vomiting in 4 cases.
No gas pain in 19 cases.
Slight gas pain in 1 case.
No backache in 20 cases.
No desire for water within the first twelve hours in 9 cases.
Only moderate thirst in 11 cases.
In all cases the postoperative thirst was much retarded.

The Sisters at St. Anthony's Hospital, St. Louis, have used it as a routine postoperative procedure in more than one hundred cases with only one case in which there seemed to be no benefit.

The technic: Quinine muriate, 10 grains, dis-

solved in 2 ounces of water at 100 F. is given by rectum immediately after operation, followed by saline proctoclysis or (in septic cases) by 6 ounces of olive oil. The quinine is repeated every six hours for four doses. If after the quinine is stopped the patient shows any signs of gas pains or backache, another dose will give immediate relief.

In all cases recorded, ether was used as the anesthetic.

3329 Park Avenue.

The Modern Treatment of Fractures. By John W. Riley, Oklahoma City, Okla. Journal of the Oklahoma State Medical Association, January, 1915, pp. 240-243.

The more frequent use of the X-ray and the elimination of any particular routine procedure of fractures, have done much to improve the end results.

In the non-operative treatment of fractures we have in use—

1. Immobilization with splints or casts.
2. Massage with mobilization.
3. Extension.

The surgeon determining the procedure that he will employ, by his ability and familiarity with the different methods, and the results as checked up by X-ray, but always avoiding long continued immobilization, on account of muscle atrophy, joint and tendon fixation; it has no place in modern surgery.

In the operative treatment we must take into consideration the experience and ability of the surgeon, in regard to this particular work. There is too little attention paid to a thorough understanding of the non-operative principles.

The cases of fracture that should be operated upon are. Those which demonstrated by the X-ray show gross deformity after efficient extension for a week, to be unreduced, such as fractures of the femur, both tibia and fibula, and those extending into or near the ankle, elbow or knee, and those of old people.

The problem then is, not whether to operate, or to not operate, but what treatment will give the best results in each particular case.

The Atropin Treatment of Dysmenorrhea. By Emil Novak, Baltimore, Md. Journal of the American Medical Association, January 9, 1915, pp. 120-122.

The treatment of dysmenorrhea of the so-called spasmodic type, i. e., the type occurring in young nulliparous women in association with scanty menstruation and frequently sterility, is notoriously unsatisfactory. The pain in such cases is probably brought about by a "menstrual colic" of the uterine muscle. The use of atropin in this condition is based upon the fact that this drug diminishes the irritability of the autonomic nerve endings in the uterus. The original method, suggested by Drenkhahn, consisted in the injection of a solution of atropin directly into the cervical canal (1 mg. to 1 cc. of water). This was later modified by Novak and others, the drug being administered by mouth. The results have been excellent. Failures, when they occur, are often due to insufficient dosage.

The author's plan has been to commence the administration of the drug about two days before the expected onset of the menstrual flow, and to continue its use until the second or third day of the flow, depending on the usual duration of the pain. Patients differ as to the degree of tolerance to the drug. Ordinarily, about 1-100 gr. is given three times a day, unless pain appears, when the doses may be given somewhat more frequently, if there are no symptoms of atropin saturation. If desired, various other analgesic drugs, such as aspirin, may be combined with the atropin. Further than the occasional symptoms due to overstepping of the patient's tolerance to the drug, no unfavorable results have been observed. In the thirty or more cases in which Novak has employed this method of treatment, the results have been most encouraging. Some failures have been noted, but, on the other hand, there have been some very striking successes.

The Conduct of Normal Labor. By D. L. Maguire, Charleston, S. C. Journal of the South Carolina Medical Association, December, 1914, pp. 749-750.

An obstetrical call takes precedence over all other calls and is to be answered at once. First duty on entering obstetrical room to find out if patient really in labor. This is done by watching patient to see if pains occur at regular intervals. Three signs of labor: (a) Recurrent pains; (b) Escape of small bits of blood-tinged mucus from vagina, "show"; (c) Dilatation of os. Vaginal examinations during first and second stages to be few and only with strict antiseptic precautions. **A parturient woman can be fatally infected by a single careless examination.** Always wear rubber gloves. During first stage, woman not to remain in bed, may have liquid food. If cervix hard, give hypodermic of morphine.

After free dilatation it is necessary, often, to rupture membranes. During second and third stage patient to remain in bed. Woman to be encouraged by obstetrician. His duty at this time to protect perinaeum. Instil silver nitrate (2 per cent) into eyes of every new born. Don't ligate cord until pulsations cease. Always sterilize two hemostatic forceps in case cord is coiled around neck, so that cord can be clamped in two places and cut between. Obstetrician never to perform any intra rectal "coups" to deliver head. Wait thirty minutes before attempting to deliver placenta. Give ergotole m. xxx immediately after expulsion of placenta and have some person hold fundus of uterus. Pituitrin has no place in normal labor as a time saver. Warning sounded as to manual extraction of the placenta. Great danger infection because amniotic cavity cast off. Must be done only after thorough redisinfection and sterilization of the hands.

RAILWAY SURGERY

AMPUTATION OF THE LEG.*

By Duncan Eve, M.D.,
Nashville, Tenn.

In the performance of an amputaion the surgeon should be reminded that his object is not only to remove an irreparable limb, but also to accomplish this end with the least possible loss of tissue, with the least possible risk of life, and to provide a stump which will not only be well covered, but painless and capable of wearing an artificial limb. The most scrupulous care should be employed to secure asepsis in clean cases, and thorough antisepsis and drainage in infected cases, so as to prevent delay in healing and complications which may prove disastrous.

In the circular method of amputations of the leg and modifications of the same, Kocker advises: "First to divide the skin and adipose tissue down to the fascia and retract the skin, then divide the fascia and retract it. Secondly, upon a higher level cut through the muscles, obliquely upward towards the proposed division of the tibia, so as to make the muscles cover the end of the bone, and over the muscles approximate the fascia by a few catgut sutures before closing the skin flaps."

In all amputations of the leg, the fibula should be divided first, from one-half to three-quarters of an inch above the saw line of the tibia, to prevent pressure against the outer wound margin.

It is also well to bevel off the spine of the tibia, or remove a small oblique section of its sharp anterior edge.

According to the statistics of Dr. W. L. Estes' Clinic, the location at which an amputation of the leg can be performed has but little influence on the dangers of the operation, except in the upper third. From his report published in the Annals of Surgery for July, 1913, it appears that amputations of the middle third are no more dangerous than those through the lower third. In this same contribution it is claimed that amputations through the knee are less dangerous than those through the upper third of the leg.

After referring to these statistics just mentioned, Dr. J. F. Binnie, in his paper on this subject before the International Society of Surgery, in New York City last April (that I had the pleasure of hearing), claimed that the choice as to the method and site of an amputation of the leg depended first on the lesion for which the operation is required; and, secondly, on the use which is to be made of the resulting stump.

For nearly all injuries the site of selection depends on the amount of tissue which is left and which is suitable for forming flaps or covering.

If gangrene has resulted from the injury, the location or level which an amputation is to be practiced will depend largely on the extent of the vascular disturbance, and which can fairly well be determined, as shown by Binnie, by the use of either Moskowicz's or Sandrock's method of examination.

The use that is to be made of the stump should often control the choice of the site of amputation. If the patient be poor and cannot afford an artificial limb, it is important to save as much of the leg as possible and attempt to give him a stump which will sustain his body weight on the bent knee (without the stump projecting too far behind), and in this way to use a wooden peg with a padded shelf. Many operations for this reason have been devised, such as Symes and Pirogoff's, for the purpose of doing away with expensive artificial limbs and even the wooden peg. If, upon the other

*President's Address, Southern States Association of Railway Surgeons, Auxiliary to Southern Medical Association, Richmond, Va., November 9, 1914.

hand, the patient can afford an artificial limb, it is often well to select the site that will make the most useful stump for a prosthetic appliance. Artificial limb-makers differ greatly in their opinion as to what length of the stump is best. Some will suggest that it should be at least six inches long, and others will claim that it is best to have it more or less than six inches. However, they seem to agree that it must not be less than four inches; therefore, we are led to believe anywhere between a four and eight-inch stump would be satisfactory for the use of an improved artificial leg, provided it be of the proper weight-bearing kind. The longer the stump the greater power it certainly possesses. Nowadays there is a tendency to make the stump as long as possible, while in former times surgeons amputated at the so-called point of election, one inch below the tuberosity of the tibia.

Many years ago Lord Liston advised not to amputate in the lower third of the leg because of the scantiness of tissue, because the stump is apt to ulcerate, and because it is uncomfortable in wearing an artificial limb. These views have entirely changed, as may be mentioned. Estes advises, whenever possible, amputation of the leg should be done through the lower third, may be done as high up as the junction of the middle with the upper third, but very rarely should it be done through the upper third, claiming upper-third amputations give a mortality, as previously stated, greater than at the knee joint. We cannot agree with this distinguished surgeon in the latter part of his statement, for in our experience amputations of the knee joint have a much greater mortality than amputations through the upper third of the leg.

Drs. W. J. and J. S. Rodman, in the American Practice of Surgery, claim very correctly "for the stump to be serviceable it must be painless, it must be able to stand pressure and the cicatrix must lie to one side of the surface pressed upon, it must be well nourished and the skin covering it should be freely movable; and lastly, it must be of good shape. A stump incapable of bearing pressure or pressure stretching without pain to the patient or decided interference with its blood supply, would be worse than useless and a constant source of annoyance.

"Too exaggerated a conical stump, due to retraction of the skin and muscles, or to both, the end of the bone being the apex of the cone, is unfortunate, as the bone may become necrosed from pressure."

Unfortunately, in the lower third of the leg the anatomical construction of the parts is such that after most methods of amputation the cicatrices are central and not infrequently adherent, and therefore the patient is unable to use an artificial limb without pain.

M. Guion's elliptical plan is perhaps one of the few good methods that disposes of the central position of the cicatrix, and according to Stimson is practiced as follows: "The incision is made in the form of an ellipse, whose lower end crosses the heel below the insertion of the tendo Achillis, and whose upper end is about an inch above the anterior articular edge of the tibia. Beginning at the lower end and dividing the tendo Achillis at its insertion, and hugging the bone all the way, the operator dissects up the flaps posteriorly as high as the upper end of the ellipse. The anterior muscles are then divided by transfixation, the bones sawn through and the posterior tibial nerve resected. In this operation the sheath of the tendo Achillis is not opened, and the tendon itself serves afterward as a covering for the ends of the bone."

Bryant advises in the lower third that it is well to make periosteal flaps cut from the subcutaneous surface of the tibia, retaining its connection with the skin. After division of the bones the periosteal flap is placed over the cut surface of the tibia and the cutaneous edges united oliquely, so that the scar lies between the bones.

In amputations in the lower third in fleshy subjects a long anterior flap containing the in-

terosseus muscles may sometimes be used according to the plan of Bell, or the rectangular operation of Teale may likewise be practiced. By either of these methods the cicatrix is placed posteriorly out of the way of pressure. The principal disadvantage of both Bell's and Teale's methods, is that it requires a high division of the bone, and therefore involves a greater sacrifice of the limb than other plans.

In the middle and upper third of the leg many operators make antero-posterior flaps—a long posterior flap and a shorter anterior one, which removes the resulting scar from the lower surface of the stump. For the upper portions of the leg the long posterior, rectangular flap advised by Henry Lee also gives good results; but in our opinion, the best method of amputation in either the middle or upper third of the leg is obtained by long external and short internal flaps, made either by transfixation (Sedilott) or by cutting from without inwards (Langenbeck). In the Selilott operation, the knife is entered a little external to the crest of the tibia, and while the soft parts are drawn to the outer side with the left hand, it is made to graze the surface of the fibula and to perforate the posterior surface of the limb as far to the inner side of the fibula as possible. By cutting downward close to the bones a broad rounded flap three to four inches long is formed. The extremities of this flap are then united to a short (one inch and a half) convex flap cut from the skin on the antero-internal aspect of the limb. The remaining soft parts being then divided by a circular incision, the operation is completed in the ordinary way by cutting the fibula off shorter. In Langenbeck's operation, as stated, the flap is cut from without.

Since good results follow all the more popular methods of amputations in the middle and upper portions of the leg, the surgeon should be guided in his choice solely by the desire to sacrifice as little of the limb as possible. An exception should be made in the upper portion of the upper third, where it is better to amputate at the knee than to save only a portion of the tibia above its tubercle.

We desire to quote from Estes again, who claims "that important factors in lowering the mortality of amputations for injuries are:

1. Saving of blood.
2. Careful asepsis or antisepsis.
3. Discrimination when to operate.

"The first two will no doubt appeal to every surgeon. The last one may be resolved practically into the determination of the blood pressure. Operate as soon as the blood will permit. A systolic pressure below 80 should contra-indicate amputation."

Kocher, in his operative Surgery, claims that Bunge has proposed to show that the protection of the raw end of the bone from pressure is of far less importance than the removal of all sensitive structures at the operation, especially the periosteum and marrow. This view led to the introduction of what is known as the aperiosteal method of amputation. This same authority claims that tenderness is due much more to excessive growth of the periosteum, which too often, it is claimed, culminates in the production of exostoses and can be prevented by removal of the periosteum covering the end of the stump, although from his experience this can also be prevented by accustoming the limb early to bearing weight on its surface.

This same authority (Kocher) suggests that the following must be considered:

"(1) Which method can be most relied upon to give a stump which can bear weight in the event of complications being present, especially in the healing of the wound? Here the answer is not difficult. With the osteoplastic method there is the greatest liability of necrosis, and the subperiosteal method leads to exostoses as the result of inflammation, while only the aperiosteal method can furnish a useful stump in the presence of such complications.

"(2) Which method is the easiest and best adapted for inexperienced surgeons, e. g., in the field? Here also the answer is not difficult. The osteoplastic method (as can be

seen in every operative course) is difficult and requires practice and care. The aperiosteal method is the simplest and most natural, inasmuch as the bone projects free from the periosteum."

In a paper read before the Section on Surgery of the American Medical Association last June and published in one of the issues of last month's Journal of the American Medical Association, Dr. H. H. M. Lyle, of New York City, holds there are four methods of treating the bone in amputation, viz: Periosteal, osteoplastic, tendinoplastic and aperiosteal. He favors the aperiosteal and cites Cramer's statistics of 96 cases of amputations through the thigh and leg, in which there were 70 bad stumps and only two capable of bearing direct weight. He then claimed a personal study of 13 amputations through the thigh and found only one end-bearing stump of the 13 amputations performed in New York clinics, by, as he states, "our ablest surgeons," and adds, "that the fault lay not in the technic of the operator, but in the method."

Continuing, Dr. Lyle says: "The aperiosteal method aims to produce a painless, supporting stump, capable of early functional use. Hirsch's investigation showed that in the old method of stripping up a periosteal cuff to cover the bone, many shreds of periosteum resulted. These shreds, still retaining their primitive osteogenetic function, produced painful bony spikes, which interfered with the early functional use of the stump. For this reason Hirsch reintroduced the Celsian method of dividing the bone and periosteum at the same level, adding to it massage, exercise and early functional use. Bunge went a step further and advocated the removal of 1 c.m. of the periosteum and the scraping out of the bone marrow for a similar distance. The correctness of Hirsch and Bunge's views are substantiated by Von Eiselberg, Kocher, Moskowicz, Witzel and Ranzi. This method had an extensive practical test in the Russian-Japanese and Balkan wars."

The technic of the Bunge method is given, followed by after-treatment, as follows: "Put the patient to bed with the leg elevated. As soon as the wound is healed begin Hirsch's medico-mechanical treatment. Massage the stump twice daily, and after each treatment rub in a 2 per cent solution of salicylic acid in olive oil. At night bathe in a warm sodium carbonate solution. Protect the stump with cotton wool. Place a box at the foot of the bed and have the patient press the stump against it from five to ten minutes three times a day, then four times, finally every hour. After each treatment energetically flex and extend the hip and knee. Now begin standing exercises. Rest the stump on a bran bag, at first placing the weight evenly on both legs; later place all the weight on the stump. At the end of two weeks the patient should be able to wear a peg leg, later a permanent prosthetic appliance, which directly receives the weight through the end of the stump."

In the discussion of Dr. Lyles' paper, Dr. F. J. Cotton, of Boston, suggested "this was another nail in the coffin of the periosteum," and otherwise criticised the aperiosteal plan.

It is astonishing that operators favoring the aperiosteal method of amputation should draw their conclusions from the condition alone of bearing direct weight on the end of the stump. This is not necessary or proposed in the vast number of amputations performed when the periosteum is divided on a level with the saw line of the bone, and good functional stumps are obtained, for they will not only stand an upward pull or stretching over the stump, but an artificial leg can be worn with the greatest satisfaction and comfort.

Osteoplastic amputations are sometimes indicated, especially at the distal ends of the femur and tibia, as in Gretti's and Pirogoff's procedures. We have made both with success and may be induced to perform these again, but don't think we can ever be persuaded to do the Bunge operation. What is the use? Like every other member of this association, our results are in the main satisfactory by less technical and difficult methods, particularly have we reference to the long drawn out

Hirsch-Bunge so-called medico-mechanical after-treatment. This plan might do well in the hands of such distinguished surgeons as von Eiselberg and Kocher, or even in the Russian-Japanese war, but it certainly is not for railroad surgeons. How many times do you fail to obtain a serviceable stump? Seldom in our opinion—only in rare instances; therefore, let's be "from Missouri."

THE TREATMENT OF COMPOUND FRACTURES OF THE LEG.*

By Thos. H. Hancock, M.D.,
Atlanta, Ga.

This subject was given to me by our President, and it seemed to be an easy one with which to deal, but there has not been a great deal written on it, and what I have to present is largely from my own experience. Your indulgence is asked, if the simpler details seem to be too much dwelt upon. There are three things to consider, viz.: Sterilization, reduction and retention, if I may use this word to denote the holding of the parts together. The same principle applies in treatment of fractures in this location as in other parts of the body. The wound is an infected one, and we will consider this phrase of the treatment first. There is no known way by which it may be made aseptic at once without sacrificing the vitality of the tissues. Many of us are not surrounded with all the conveniences of a modern hospital, but we are all able to get the same results if the technique is perfect. It has been said by John Wesley: "Cleanliness is, indeed, next to godliness," but one of our grand old teachers has said that in surgery godliness was next to cleanliness. It is our duty then to make these wounds as nearly sterile as possible, and then leave them in the best condition for nature to repair. A prominent surgeon of this state not long since recommended the immediate closure of them, but this does not seem to me to be the safest procedure, for the tissues may not be able to take care of the germs which are enclosed. The area around the wound should be shaved and thoroughly washed with tincture of green soap and water. Benzine is useful to remove any grease which may be present. A 50 per cent alcohol solution should next be applied, and this followed by a 1-2000 solution of bichloride of mercury. The latter two should be also applied within the wound. The stronger solutions tend to devitalize the tissues and encourage sloughing. The wound cannot be rendered sterile, drainage is always advisable, and the opening should usually be enlarged, any fragments of bone, blood clots or foreign substance removed and a counter opening made in the back of the limb. Two drainage tubes should be inserted, one passing entirely through the limb and the other to the bottom of the original wound. These tubes should be sutured to the skin to hold them in position, or a safety pin may be passed through them for the same purpose. The reduction should now be made, gauze saturated in the bichloride solution placed over both openings and gutta percha tissue applied over it, allowing no edge of the gauze to protrude.

Some one has said that if the surgeon does laparotomies with his bare hands that he should wear gloves while doing these operations, that the bone was more readily infected than the peritoneum, but I do not agree with him. The compound fracture is infected at the time of the accident. The reduction is usually very easy, but the retention is more difficult. It should be attempted by the use of plaster of paris splints, one posterior and one anterior, a cast, felt splints, perforated metal or any splint which may be at hand.

If practicable, a skiagraph should be taken immediately, one from above downward and one from side to side, and developed before the patient awakens from the anaesthetic, so that any necessary correction may be made at

*Read before Southern States Association of Railway Surgeons, Auxiliary to Southern Medical Association, Richmond, Va., November 9, 1914.

once. Similar skiagraphs should be made about the tenth day to see whether the ends of the bones are still in their proper position. The anterior and posterior plaster of paris splints are ideal. They should extend from the toes to the upper third of the thigh. They are held in position by a roller bandage which is applied before the plaster hardens. Adhesive plaster strips should surround it at varying intervals. The anterior splint may be removed entirely for the dressings without danger of displacement if the proper care is taken. The gutta percha tissue over the drainage tube at the bottom should be placed so that it may be removed without displacing the bottom splint when the wounds are dressed on the second day. Some of them will not unite readily and union is always slower than in simple fractures. If there is not good union in six or eight weeks it is advisable to apply a plaster of paris cast and allow the patient to walk on both limbs, using crutches so as to modify the weight on the affected member. This method may still not cause union and operative interference becomes necessary. If so, we now have a sterile field to deal with, and we may employ one of two methods; either wire with bronze wire, which is very strong and will stand twisting tightly (the silver wire is too fragile), or use the bone peg described by Murphy.

An extensive opening should be made in front, the partial union carefully disconnected and the ends of the bones brought out through the opening. When only one bone has been fractured the other acts as a splint, and it is not the rule that we have to resort to operative interference. However, when the tibia alone has been broken we may have non-union in it. If so, when the operation is performed a section should be taken out of the fibula so as to allow the ends of the tibia to come snugly together. When the ends are brought out they should be sawed off so that they fit together, and the tibia alone should be wired. One hole should be drilled commencing about three-eighths of an inch from the end and coming out in the medullary canal, and the other in the lower fragment in the same way. The wire is readily passed from without inwards, but the end that goes through the medullary canal and comes out at the outer opening is harder to insert unless it is done by passing the eye end of a large curved needle through from without inwards, threading the wire in it and drawing it through. It is well to see that the drill point is large enough to allow this. One wire is sufficient as a rule to hold the ends in place, but two may be put in, one in front and the other interior to it. The wound is then closed and the plaster of paris splints or cast applied. The bone peg may be employed as follows: the ends are prepared as above, and the peg which has been cut from the front of the other tibia is placed in the medullary canal of one end of the tibia and the other end of the peg placed in the medullary canal of the other, as they are brought from a flexed position to a straight one.

The treatment is then the same as if the ends had been wired. The employment of this instrument, a Lane's plate, does not appeal to me. This is a large one, but the smallest ones that can be used are too large for the tissues to tolerate, and I believe the great majority of them will have to be removed or they will work out at some time. It has no advantage over the other two methods, and has this disadvantage. There is no question but that many of us can place them in position aseptically and skilfully, but the results are not satisfactory. They will work out or have to be removed. Compound comminuted fractures in this location should not be despaired of as good results may come from those which seem at first to be almost hopeless. Some of us get good results from the use of certain antiseptics and others get equally as good from the employment of others. Whenever we are in doubt about asepsis in a wound we should drain, therefore drain *all* compound fractures. Surgical cleanliness is the chief factor in getting perfect results.

EYE, EAR, NOSE AND THROAT

SARCOMA OF THE NASO-PHARYNX.*

By R. C. Dorr, M.D.,
Batesville, Ark.

I shall make this paper very brief, only attempting to boil down a few practical points.

Malignant disease having its origin in this region would seem to be of exceedingly rare occurrence. Of the two forms, sarcoma is met with much more frequently than carcinoma, but as I shall adhere to the title of my paper, I shall treat only of sarcoma.

According to Bosworth, up to 1889 there had only been nineteen cases reported of sarcoma of this region. How many have been reported since I am unable to say.

Sarcoma is usually regarded as belonging to the early period of life. This is true as compared with carcinoma, and yet in the nineteen cases reported by Bosworth, the ages were as follows:

Between 1 and 10 years of age	2
Between 10 and 20 years of age	5
Between 20 and 30 years of age	3
Between 30 and 40 years of age	2
Between 40 and 50 years of age	7

ETIOLOGY.

Sarcoma of the naso-pharynx is not of common occurrence. It is found more frequently in males than females, more often between the ages of forty and fifty than at any other time in life, although it may occur early in life, one case reported occurring at one year of age. The tumor has its origin in the submucosa of the mucous membrane lining the basilar process of the occipital bone. The growth, which usually extends downward, is lobulated and irregular, and as it is of the small round-celled variety, extends rapidly and soon involves the pharynx. As a rule, the bony structures are not implicated, although in some cases such involvement does occur.

The tumor is soft and fungoid in character, and rapidly invades the lower pharynx, although it may extend upward and involve the sphenoid or ethmoid sinus, or forward, involving the maxillary sinus.

One thing to remember in regard to sarcoma is that it has no true capsule.

The diagnosis is made by the clinical symptoms and by the microscope. In early life sarcoma runs a rapid course, as it is usually of the small, round-celled variety. If it be of the large-cell, it will invade adjacent structures slowly, and the forecast as to prolongation of life is more favorable. The prognosis, however, as to thorough eradication is markedly unfavorable.

TREATMENT.

Statistics show that the radical operation gives a high mortality. Besides, should relief be given at the time, there is a marked tendency to recurrence. Patient's general health should be sustained by general tonics, preferably arsenic.

The authorities I have consulted recommend removal by curetts, snares, etc.

I will give you the method of treatment I use and the symptomatology by the report of the following cases:

I was asked, March 30, 1910, to examine Miss S., age 12 years. I obtained the following history: Family history negative as regard hereditary disease; had had usual diseases of childhood; had been treated nine months for catarrh of the nose. I found the following conditions: Left side of nose completely stopped up with the purulent discharge flowing from that side of the nose. Exophthalmus of the left eye. Both middle ears infected and discharging. Soft palate pushed forward, difficult breathing. A tumor in the naso-pharyngeal space.

She was brought to my office on December 30, 1910, and I removed a tumor with my finger, with

*Read in Section on Ophthalmology, Rhinology, Otology and Laryngology, Southern Medical Association, Eighth Annual Meeting, Richmond, Virginia, November 9-12, 1914.

gauze around it, about an inch and a half in diameter. It was attached to the basilar process and the septum.

From the gross appearance I diagnosed it to be sarcoma. By kindness of Dr. J. W. Case, of Batesville, a specimen was sent to his daughter, Miss Jo, who was studying pathology in St. Louis at the Washington University Medical School, and

Sarcoma of the Naso-Pharynx. Age 12 years. Before recovery.

was diagnosed giant cell sarcoma by Dr. Geo. Smith, assistant pathologist.

After giving her a cleaning lotion for her ears and nose I sent her home, expecting her to die. On May 12, 1911, she was brought back to my office, and I removed a similar tumor. September 18, 1911, removed another, December 11, 1911, another, not so large as the others. April 6, 1912, still another, not so large as the last. I have never explored the antrum to see what the nature of the trouble is. It does not seem to have impaired her general health at all.

I herewith show her picture, which shows the exophthalmus and a slight facial paralysis of the left side.

I hope to make a report of the final termination of this case.

December 19, 1912, removed another tumor. Since that time there has been no recurrence. I believe that I am justified in reporting this as a cure, as there has been no return for nearly two years.

Sarcoma of the Naso-Pharynx. Age 16 years. After recovery.

My experience with sarcoma is, if they do not return in the first twelve months, they seldom return.

The patient is now in perfect health, as the picture which I now pass around will show.

I had a pathologist examine the last tumor removed and he reported it sarcoma.

I shall briefly report a case of maleno-sarcoma of the eyeball.

Mr. C. consulted me on March 20, 1913. History as follows: Age 77; family history negative. Some twelve months before he had begun to notice

loss of vision in eye and for several months had had severe pain.

My diagnosis was, melano-sarcoma of the choroid.

The disease had already advanced to the third stage. I advised enucleation, but he refused and went home.

Came back August 6, 1913, and I enucleated it. It showed the tumor penetrating through the coats of the eye-ball at the anterior and posterior poles. The patient died nine months later of stomach and liver trouble, which may have been sarcoma. He had no return of pain or tumor in orbit.

My object in reporting this case is to show this rare specimen, extreme age of patient, and that when the tumor penetrates the coats of the eye-ball it does not stop the pain, as some authorities claim.

DISCUSSION.

Dr. H. N. Dickson, Paragould, Ark.: I have not had much experience with sarcoma of the nose and throat. The report of this case should teach us to attack the various forms of sarcoma more vigorously and radically than has been done in the past.

Dr. Hilliard Wood, Nashville, Tenn.: I have had three of those cases that were diagnosed clinically and microscopically as sarcoma, all in young people, two in boys, one in a girl, all about sixteen, in which the operation was seemingly successful, in the boys at any rate. The girl was successful for a year or two afterward, and I lost track of her. The operation adopted in those cases was this: General anesthesia is used. The soft palate is pulled out of the way by a rubber band passing out through the nose and mouth. The growth is removed with a Langenbeck's periosteal elevator passed through the mouth from below up. It is very simple, and can be done in thirty seconds. The strange thing about it is that, notwithstanding the microscopic report that there was sarcoma of the mixed cell variety, the two boys are still in perfect health today, some seven or eight years after the operation.

Dr. J. A. Stucky, Lexington, Ky.: Nine years ago at the meeting of the American Academy of Ophthalmology and Oto-Rhinology, at Indianapolis, I reported a series of nine cases of fibro-sarcoma of the naso-pharynx, and my experience with those cases is that if we get at them early they get well. At that time I showed this instrument, and I thought Dr. Dorr's paper was going to have something to say about the fibrous variety. In those cases where there is a fibro-sarcoma there is no snare that would cut it—none that I have ever seen—and I have had some made especially for it. And I resorted to the method described by Dr. Wood, of passing tape through the nares and tying the soft palate forward, but I could not cut through the growth. So I devised this instrument, which is simply a modification of the old adenoid curet made on the principle of an obstetric forceps. You introduce the female blade and then the left blade well up under the growth, and then lock it and gradually tighten it. The thing that we dread most in this operation is the hemorrhage. Defenback, in his book, said three things confront us, the danger of suffocation on the table, dying from hemorrhage and dying from shock. After three or four failures, I succeeded with this instrument—after getting the blade locked and waiting a moment or two you cut off the bleeding spot. Then just simply twist the whole thing out en masse. Those of you who have the Transactions of the Academy will see the illustrations of the growths and also of this instrument. I brought it simply to show to some of the younger members of the section.

Dr. T. W. Moore, Huntington, W. Va.: Dr. Stucky remembers that two of the cases that he reported at Indianapolis were ones that I had operated on. At that time I took one of the fibroma out by slipping a galvanic cautery wire over it and turning on the current. I removed one a few weeks ago the same way, one prong of which had been sticking out of the nose for thirteen years. By doing it this way you have practically no hemorrhage.

Dr. Dorr (closing): I think the instrument is all right, but when you can do it with your fingers what is the need for it? My case did not have any hemorrhage. My patient went out seven miles into the country, after each removal. The books tell you to use those things, but they sometimes have hemorrhage.

ABSCESS OF THE FRONTAL LOBE SECONDARY TO PURULENT FRONTAL SINUSITIS—THE REPORT OF CASE WITH RECOVERY.*

By F. Phinizy Calhoun, A.B., M.D.,
Atlanta, Ga.

Consulting the literature of the subject under discussion, to my astonishment I found recorded only a total of 39 cases, 22 of which had been collected by Seifert in 1905, with only one recovery (Danker), and other cases have since appeared with four recoveries (Ripen, Brown, Emerson and Blondian). With a total mortality of 87.1 per cent, one can appreciate the seriousness of a frontal lobe

*Read in Section on Ophthalmology, Rhinology, Otology and Laryngology, Southern Medical Association, Eighth Annual Meeting, Richmond, Va., November 9-12, 1914.

abscess and the grave prognosis which it presents.

I report the following history and notes for your consideration:

Mrs. J. M. C., age 58, was brought to my office November 24, 1914, by Dr. Blair, of Marietta, Ga., and as the patient was unable to give an account of herself, he related the important facts in her history since she had been under his care. She had raised a large family on a farm near Marietta, and her previous health had always been good except for daily headaches, described as being on the top of her head. There was no history of an acute or chronic nasal discharge. About four weeks before this visit she complained of severe headache and pain in the left eye, and within a few days there appeared swelling in the upper lid with increased pain. Fluctuation was detected and an incision was made evacuating an abscess which discharged freely. Her temperature had been 100 and at times she complained of chilly sensations. Since this minor operation the patient had lost ground daily and for the past few days she had grown very despondent, with a decided loss of memory. When bringing the patient to Atlanta she dropped into a slumber on the train, from which she could only be aroused with difficulty.

Examination—Fairly frail woman, who showed by her facial expression that she had experienced great care, worry or long continued pain. She appeared to be in a stupor, and talked to loudly or abruptly would reply, giving unintelligible answers, and when let alone would lapse into a sleep.

Nose—Normal in appearance and no pus seen after shrinking of mucus membrane. Transillumination gave no information. Pharynx and nasopharynx dry.

Eyes—There was a discharging sinus in the left upper lid near the nose, and a probe there introduced appeared to lead into the ethmoid cells. There was also some swelling and drooping of the upper lid. Arousing her from her stupor, she recognized the large size test type at twenty feet, but could not read further. Eye grounds normal in every respect. Temperature, 99; pulse, 84; respiration, 20. Blood, haemaglobin, 90 per cent; red cells, 4,800.000; white cells, 11,500. Culture of pus from discharging sinus proved to be staphylococcus albus.

A tentative diagnosis of purulent frontal and ethmoid sinusitis was made with possibly some frontal lobe complication. An operation was advised, but deferred for twenty-four hours until the family could be conferred with. The night spent in the hospital previous to the operation was an eventful one to the attendants and nurses, as she was wildly delirious, getting out of bed and making night hideous until controlled by hyoscin.

FIRST OPERATION.

A curved incision was made through the eyebrow extending to the side of the nose down to the bone, and the periostium and soft tissues were retracted. A large area of necrosis was found under the frontal ridge about where it joins the nasal bone; this connected with the sinus in the upper lid and proved to lead to the frontal sinus, which was filled with granulations and polypi. The entire external wall of the sinus and a part of the floor was removed and the cavity cleaned of all material. There was also found a large epidural abscess covering the anterior portion of the frontal lobe, with marked necrosis of the surrounding bony wall. No bony septum connected the two frontal sinuses and the right sinus was filled with granulations, an extension from the left. The anterior ethmoid cells were opened and ablated, but found quite healthy. No opening was established into the nose. The sinus cavity was wiped clean after the exposed dura was curretted of granulations and the greater portion of the posterior wall of the sinus was removed, exposing healthy tissues. The tension of the brain did not appear to be elevated, and it was thought best to defer any exploration until further conditions demanded it, for the pressure symptoms, such as headaches and even the mental disturbance, could be accounted for by the large epidural abscess. The wound was packed lightly with iodoform gauze and a dressing applied.

POST-OPERATIVE NOTES.

Patient reacted slowly and did not regain consciousness for several hours. The following day temperature, 100; pulse, 100; respiration, 20; conscious and moved about in bed. No change in condition for two days and then temperature never above 100, but pulse had been full and bounding. November 30, five days after operating, lost considerable ground; drowsy and slept most of the time. Did not take nourishment. Consultation with Dr. J. E. Paullin. Neck stiff and complained of pain on lateral rotation of head, but would not talk. Pupils reacted to light; eye grounds normal. Blood pressure, 136 m.m. Hg. Pulse soft. Blood, white cells, 15,000; polynuclear, 74. Exploratory operation of frontal lobe advised.

SECOND OPERATION.

All sutures removed and wound laid open and cavity cleaned. A dirty gray exudate found on

the dura and there was seen at the center of the dural exposure a small sinus through which exuded a yellowish discharge. Sinus enlarged longitudinally and brain found firmly adherent to meninges with obliteration of subdural space. A director was introduced 1 c.m. directly into the brain and there followed a gush of thick yellow pus without odor, which amount was estimated to be about one and a half ounces. The opening was enlarged and the cavity was inspected and appeared to be well walled off. A large fenestrated rubber tube was introduced into the cavity and held in place with iodoform gauze. Two sutures were placed in the extreme angles of the original brow incision and the sinus wound dressed in the usual way.

Two hours after operation the patient reacted nicely and talked rationally; asked for nourishment and retained an albumen. Nourished every three hours when awake. Next day temperature 99, pulse and respiration normal. Mind much brighter and she recognized her daughter, who was her constant attendant. Took nourishment nicely. Three days after operation wound dressed and gauze thoroughly saturated with pus, tube removed and cavity of brain wiped clean and tube reinserted and dressings applied; ordered back rest to facilitate better drainage. Temperature, pulse and respiration normal. Mentality improved and wanted to talk a great deal. Five days after operation brain cavity cleaner, mental condition improved. Soft diet ordered. For the next three weeks there was a steady improvement in her physical condition and the rubber draining tube was replaced by a small gauze wick. While her mentality was decidedly better, she talked wildly, and even irrationally at times; for example, one day while dressing her she related that her cow gave her a great deal of trouble and she thought it would be best to sell her; then again she had an insane desire to get home, as she thought her children were being ill treated. Slowly those illusions disappeared and on January 9, thirty-nine days after the second operation, she returned to her home where the sinus wound was dressed by her physician, as the brain cavity had entirely closed. On January 18 she had a relapse of her mental disturbance with a rapid rise in temperature to 103; pulse, 110; respiration, 20; and finally she went into a stupor the next day. I found the sinus wound granulating and filling in nicely and there existed only a cone-shaped depression the apex of which evidently corresponded to the old abscess. A grooved director was there introduced, with the escape of a thin yellow fluid. This opening was enlarged and a gauze drain inserted. The wound was dressed daily in this manner for ten days and hexaemethylenamin given in large doses.

March 1: "Doing nicely, wound nearly well," writes her husband.

April 28: Seen in office. Wound nearly healed and little deformity.

Vision 20-20 each eye, but complains of diplopia (paresis of superior oblique L).

July 27: Seen in office. Been well one month. Very slight deformity, good vision, no diplopia. Mentality good, but patient frankly states that she cannot follow a conversation and her memory is not as retentive as formerly.

September 1: She writes she is entirely well and her mental faculties are as good as ever.

An important and interesting point in the case is the manner in which the frontal sinus became infected. Finding a normal nares with no sign of pus in the middle meatus, even after prolonged shrinkage, it is reasonable to offer the explanation that following a severe cold, some months previous, the infection traveled up the naso-frontal duct, and later its ostium became completely occluded, blocking all avenues of drainage. Similar explanations have been made for the formation of frontal mucoceles.

It has always been my impression that the frontal lobe was the seat of memory. Neurologists now claim that memory *per se* is not a single faculty, for if it were a distinctive power, it would be alike strong for all subjects, as Hollander puts it, and he concluded that there is no general faculty called memory, but that each faculty, such as seeing, hearing, smelling, touching or other, has its own power of revealing its impressions. Trained dogs or monkeys after the destruction of their frontal lobes, not only were memory and judgment impaired, but they did not recognize the places or persons with whom they had been previously familiar and all freshly acquired habits and knowledge were lost. It is interesting to learn that if only one lobe was destroyed, the intellectual associations were not lost, but retarded, and emotions and passions were manifested the same as before. By animal experiments and the large number of cases recorded of frontal

lobe derangement, writers now claim that there are special centers in the frontal lobes for different memories, but as yet no accurate localization has been made.

It is definitely determined that when the frontal lobes are destroyed by injury or disease, the process of judgment and reason are diminished, and to further quote Hollander, "there is an inability to fix the attention, to follow a continuous train of thought, or to conduct intellectual process, ultimately ending in complete dementia." This has been further proven by Starr's observations and summary of mental disturbances, following diseases (including abscess) of the frontal lobe in twenty-three cases, in which he says the form of mental disturbance in lesions of the frontal region does not conform to any type of insanity, but it is described as a loss of self-control and subsequent change in character. Even in irritating pathological conditions, as an hyperaemia or surely in an abscess, the patient forms plans and projects, has a rapid flow of ideas, and through stimulation of the speech center is loquacious, but his stream of talk and ideas is perfectly coherent; it is only in the advance stage that he may become incoherent.

A review of a considerable number of the reported cases, especially the favorable ones, shows one very noticeable fact, viz: the lack of a thorough neurological examination and the report of the mental findings before and after operation. In this respect, I have also been very remiss, but studying the mental symptoms of this particular case and those related by neurologists as occurring in any frontal lobe derangement, it is seen clearly that they coincide. In Stucky's fatal case of frontal lobe abscess, secondary to a traumatic infection of the ethmoid cells, the mental symptoms were unusual in that there was threatened suicide.

The way of infection of the brain from a frontal sinusitis differs greatly, but undoubtedly the majority occur secondary to an osteomyelitis of the posterior wall of the sinus, as was my case. In two cases mentioned by Siefert, the infection took place through the diploe of the posterior bony wall, while in another it appeared to have made its way from the cribrifom plate and the frontal sinus by secondary infection of the ethmoid cells. Heymon states that in his case the communication between the cranial cavity and diseased neighboring cells of the nasal cavity could not be found, while Denker, in his description of the first reported case of recovery, says that the infection seemed to have followed the bony veins through the posterior wall into the meninges.

As to the best manner of approaching a frontal lobe abscess secondary to a frontal sinusitis, needless to say the removal of the posterior bony wall of the sinus offers the best route, but as Denker has clearly pointed out, there are certain danger marks in the brain which should be remembered, chiefly the anterior horns of the lateral ventricles, and he gives measurements which are really worth while remembering when penetrating the brain. The distance of the anterior portion of the anterior horns to the anterior region of the frontal lobe measured in a horizontal plane (about 2½ cm. above the floor of the anterior cranial cavity) amounted to 2.7 to 3.9 cm. (average 3.3 cm.), and the shortest distance of the farthest portion (laterally) of the anterior horn to the lateral surface of the medium frontal lobe was on an average of 3.1 cm.

The approach through the temporal region of a frontal lobe abscess is mentioned by McCoy, although a large abscess had been previously evacuated through the frontal route. A section of bone three-fourths of an inch in diameter was removed in the temporal region and an opening to the abscess cavity was there made. The cavity was found large and iodo form gauze drain was used. The patient began to improve and there only remained a hernia from the first wound, which gradually diminished. The final outcome is not mentioned.

Regarding the treatment and dressings of a cerebral abscess, from my experience and observation in this case and other cases, I be-

lieve in doing as little as possible, and condemn the undue use of any speculum and encephaloscope, the use of tight gauze packing, or the introduction of the finger, probes or curette, as such procedures only break down nature's barrier and new avenues of infection are at once opened. A large enough opening should be made into the brain to facilitate good comfortable drainage, and I have found that a fenestrated rubber tube of sufficient size answers every purpose.

833 *Candler Building.*

DISCUSSION.

Dr. R. W. Bledsoe, Covington, Ky.—I was very glad indeed to hear Dr. Calhoun's paper. It is on the same line as mine, only he has given us a more carefully prepared and more extensive report.

Just a word.

The particular part upon which I desire to lay stress is the remark he made in regard to unnecessarily handling the brain tissue. It is not necessary that you see or feel the inside of an abscess cavity. I think it is sufficient to put in a hemostat or any such instrument and drain the cavity freely. You do not have to get out every bit of pus. The general surgeon does not do it in any other abscess cases, but is content with getting the majority of it out and then putting in a drain.

Now, I do not know whether or not Dr. Calhoun condemns totally the gauze drainage. I agree with him in condemning it if the gauze drainage is packed in tight. You are defeating the object for which you insert the drainage if you pack it tightly. Gauzed drainage introduced lightly, I daresay, will give you as much service as the perforated rubber tube.

The doctor is certainly to be congratulated.

Dr. H. H. Martin, Savannah, Ga.—I am sorry I did not get in in time to hear all of Dr. Calhoun's paper. I heard the latter part of it.

Personally, I never saw a case of abscess of the frontal lobe. But it has been my good fortune, or misfortune, to see several abscesses of the cerebellum. I quite agree with Dr. Calhoun that the less traumatism produced in the surgical intervention the better. In the cases I have had to do with we have followed the routine of introducing closed forceps and spreading them sharply, allowing the evacuation of the pus, and putting in no drainage at all, and then at the daily dressing this same procedure is repeated. The forceps are introduced closed, sharply spread, and, as Dr. Bledsoe stated, allow as much pus to escape as will, and then dress the wound with moist, antiseptic dressing and leave it alone until the next day, and if you are fortunate enough to have secured a perfect drainage your patient is pretty sure to get well. I do not know any possible part of the body in which abscess cavities evacuate themselves as they do in the brain. Of the three cases which I have seen, two of them got well and one died, and it was entirely, I think, due to the fact that the drainage was made continuous by the daily introduction of closed forceps and then spreading them.

Dr. Calhoun (closing)—I do not think I have anything else to say, except to agree with Dr. Bledsoe, that the gauze packing is all right, providing it is not packed too tightly to break down any barrier which nature has put there.

AUTHORS' ABSTRACTS.

Eye, Ear, Nose and Throat.

The Eye Symptoms in Brain Tumor. By Horace T. Aynesworth, Waco, Texas. Texas State Journal of Medicine, October, 1914, pp. 235-238.

The writer reports four cases of brain tumor, two of which were confirmed by operation. One showed the interlacing of color fields first observed by Cushing.

A review of the other eye symptoms, as seen in different cases, is then made, and the following noted: Pupillary symptoms are not characteristic or diagnostic. Paresis and paralysis of the extra-ocular muscles are fairly common. Nystagmus, generally toward the side of the tumor, is seen in many cases. The vision is often remarkably good in the presence of a high-grade choked disc. This will eventually grow worse and finally be lost. Fundus changes are the most constant and important, being present in 70-90 per cent of all cases, and vary from a beginning hyperaemia of the disc up to a choked disc of 9 or more diopters of swelling. The greatest choking or the oldest process is more often ipsolateral with the tumor. In general terms, it may be stated that tumors tend to produce choked disc in increasing ratio from the anterior to the posterior pole of the brain, and inversely from the cortex inward. As to the cause of choked disc, the mechanical theory of Manz and Schmidt-Rimpler has by far the greater number of adherents. The theories of Schieck, of Mamourian and Smith, of Paton and Holmes, and the inflammatory theory of Leber and Deutschman, are briefly reviewed. Treatment of the tumor is removal if possible; this failing, decompress.

First Aid to the Injured Eye. By Albert B. Mason, Waycross, Ga. Journal of the Medical Association of Georgia, January, 1915, pp. 270-275.

The author emphasizes the following:

The general practitioner is frequently called upon to treat eye injuries, and does not always have the benefit of consultation with an ophthalmologist.

A record of vision—both eyes—should be made before doing anything in the way of treatment.

Argyrol should be used in 50 per cent solution to prevent infection in all classes of injuries.

Atropine sulphate gr. IV to the ounce is always indicated, and should always be used, if the cornea

is injured. If uncertain, use it the first visit, except in old people.

Do not use cocain if the cornea is injured, for it destroys the vitality of the cornea. Dionin 5 per cent is the best analgesic. The cornea has no blood vessels, deriving its nutrition from surrounding tissues. For this reason ice should be interdicted.

The cornea, from its situation, is usually injured in eye accidents. Non-perforating wounds call for thorough cleansing of the eye, argyrol, atropine, White's ointment, and a bandage.

Perforating wounds of the cornea, usually complicated by injuries to the iris, lens, and ciliary body, and by infection, are always cases of doubtful prognosis. Liberate the iris and let out as much of lenticular substance as possible through the original wound. Argyrol, atropine, White's ointment and a pressure bandage complete the toilet.

All injuries of a serious nature should have the advantage of consultation with an ophthalmologist as soon as possible, but first aid treatment by the general practitioner will save eyes that otherwise would be lost.

Tobacco Amblyopia. By A. W. Stirling, Atlanta, Ga. Journal of the Medical Association of Georgia, January, 1915, pp. 266-269.

Dr. Stirling divided retrobulbar neuritis into acute (concerning which he referred to a paper which he had read some years ago before the Southern Medical Association, in which he quoted sixteen of his cases) and chronic, of which tobacco amblyopia is the most familiar example, a form, however, which may be due to a number of other poisons, though probably not always to an affection of precisely the same nerve cells. He stated that tobacco amblyopia affects most frequently older rather than younger men, and especially when the health is below par; usually a concomitant is indulgence in alcohol, but a number of cases have been observed in total abstainers, and also in alcoholics who are non-smokers. Pipe smoking is probably the most likely to produce amblyopia, and tobacco chewing is sometimes blameworthy. One of the most important practical points brought out was the danger on railroads and ships, because of the central color blindness which coexists along with a fair amount of form vision. The pathology was briefly explained (the degeneration begins in the retina and affects mainly the macular bundles of fibres), treatment was outlined and a number of cases cited.

Indications for Removal of Tonsils. By W. Likely Simpson, Memphis, Tenn. Memphis Medical Monthly, December, 1914, pp. 1132-1135.

Usually it is possible to say whether a tonsil should be removed or not, but if in doubt it is better to remove an occasional tonsil which would not do harm than to leave many which cause serious trouble. Large tonsils in adults are always diseased and should be removed. The size of the tonsils gives very little information, as the small tonsil is probably just as often diseased as the large ones.

The submerged tonsil with adhesions drain badly and cause more general symptoms than the predunculated, apparently larger tonsils and these should be removed. Tonsils with frequent attacks of acute tonsillitis should be removed.

Tonsils containing cheesy plugs or pus, even though the patient does not know of their presence, should be removed as they often cause headaches, fever, rheumatic pains and symptoms of systemic toxemia.

Tonsils around which peritonsillar abscesses occur should be removed.

Patients with enlarged glands below the angle of the jaw, etc., should have tonsils removed.

Children with croupy attacks, colds and bronchitis are usually much benefited by the removal of adenoids and tonsils.

Diptheria is much less liable to occur in children without tonsils.

Primary tuberculosis, malignant growths, chancre and leptothrix mycosis of the tonsils are best removed by the removal of the tonsils.

Joint troubles, acute and chronic, endocarditis, pericarditis and muscular rheumatism bear a very close relationship to septic tonsils and are usually relieved by the removal of the tonsils.

Nephritis, chorea, acute thyroiditis, etc., are at times caused by diseased tonsils and would be relieved by the removal of the tonsils.

The More Rational Methods of Treating Aural Diseases. By Dunbar Roy, Atlanta, Ga. Journal of the Medical Association of Georgia, January, 1915, pp. 257-262.

There are two distinct types of acute inflammation of the middle ear: (a) acute catarrhal; (b) acute suppurative. In the first variety remove the offending tonsils and adenoids. Early puncture of the drum is recommended.

Syringing should not be used unless for continued pain after the drum has ruptured. In children early puncture is advisable. In adults the inflammation can be frequently controlled without it. I have used 20 grs. nitrate of silver, passed into the eustachian tube on a cotton tipped wire. In 90 per cent of the cases the inflammation was stopped. The naso-pharyngoscope allows exactness in giving this treatment. If, however, this does not check the inflammation in 24 or 36 hours early puncture of the drum must be made. Adenoids and enlarged tonsils should be removed in almost every young child. Stenosis of the eustachian tube is not the real cause of progressive deafness. Whale-bone bougies will accomplish a dilatation of this condition when compressed air will not.

In the eustachian catheter we have the only radical means of inflating and treating each middle ear independently. With the catheter we can use compressed air with a definite pressure. The catheter is introduced under direct observation by means of the pharyngoscope so that one can use medicated liquids, cotton applications or bougies, and at the same time know that they are reaching the right spot. The mucous membrane of the eustachian tube and middle ear must be treated, and in no other way can you put medicaments on these parts.

For the cause of progressive deafness we must look for some inherent changes in the structures of the ear proper. Remember that the ear is not a distinct entity from the rest of the human anatomy. Intestinal toxemia should be attended to.

The Relation of the Rhinopharynx to the Middle Ear and Mastoid. By E. L. Jones, Cumberland, Md. Journal of the American Medical Association, January 9, 1915, pp. 115-118.

Basing claims on a plan of treatment used for more than one-sixth of a century, the conclusion is reached that the treatment of the rhinopharynx is the key to the middle ear and mastoid, which are considered as accessory sinuses of the rhinopharynx. Disease of the mastoid is nearly always an extension from the middle ear, and disease of the middle ear is probably always from an infection originating in, or traveling by way of the rhinopharynx, whether or no such infection be recognized by local signs.

Applications are made once daily to the rhinopharynx of a mixture of iodine and carbolic acid in glycerine, of sufficient strength to cause a severe and painful reaction. In conjunction with other minor treatments to the nose and ear and internal administration of hexamethylenamin, in acute inflammatory cases, the inflammation is soon limited to the tympanic cavity, and is therefore mild, harmless, and of short duration.

The treatment of rhinopharynx is also the keystone of treatment in chronic catarrhal deafness, and helpful in most cases of chronic aural suppuration..

Emphasis is laid on the harmful effects of quinine, salicylates, and salicylate substitutes, such as aspirin, etc., in both acute and chronic ear diseases. Tympanic inflation is regarded as a fetish and of no real value.

Reference is made to subperiosteal injections in a manner analogous to subconjunctival injections in the eye.

AUTHORS' ABSTRACTS—MEDICINE.

(Continued from page 217.)

An Unusual Case of Anaphylaxis Following the Administration of Tetanus Antitoxin. By Dwight Gordon Smith, Washington, D. C. Washington Medical Annals, January, 1915, pp. 18-21.

Anaphylactic shock is not unusual. If it were this case would not be reported. We have all seen mild cases of anaphylaxis following the administration of horse serum even in small doses. The peculiar aspect of this case was the length of time from inoculation to appearance of the anaphylactic symptoms and the severe character of the latter. On July 21 R. E., aged 8, fell from a porch on some glass underneath, cutting the third finger to the bone from one end to the other, palmar surface of the righ hand. She was covered with blood when I saw her, and the cut full of dirt. Wound was cleaned, treated antiseptically, and dressed, and 1,500 units of anti-tetanus serum injected between scapulae. Wound did well and patient was up and about until the tenth day, when she developed a bright red scarleting rash—no fever, no throat symptoms. The next day she had large wheals scattered over the skin, accompanied by intense itching. Three days later a severe oedema of the face, developing worse at night, lasting a week. A week later the joints began to swell, were intensely painful, and were accompanied by high fever prostration and delirium. This lasted a week, after which the patient gradually improved. Hence she had the injury on the first day, first symptom of urticaria on the tenth, oedema on the fifteenth, arthritis on the twenty-second, the entire course lasting one month.

An Anatomic Explanation of Many of the Cases of Low Backache and Sciatic Pain. By John Tolson O'Ferrall, New Orleans, La. New Orleans Medical and Surgical Journal, January, 1915, pp. 608-617.

Sciatica has been regarded, in the past, as a disease, the causation very obscure and its treatment productive of very little relief. It has been found, by use of the radiograph and further knowledge of the sacro-lumbar joint, that in nearly all instances it is due to **a mal-formation of the transverse and articular processes of the last lumbar vertabra.** Thus is a symptom. However, dislocations of the vertibrae or inter-vertebral discs, tumors of the cord and prostate and perineural structures should be thought of. The vent is usually sudden and the patient presents the following typical picture. Low backache, pain over entire region of sciatic distribution, marked limitation of spinal motion, straight leg raising, and by hyperextension of thigh, usually a spinal list away from the affected side or a true scoliosis. Often permanent flexion of hip and knee on affected side.

Most readily relieved by rest in bed with affected leg in extension at 45 degrees, with leg straight. After relief of pain (which is quite quickly) plaster jacket with market spinal extension; subsequently reinforced belt and care in twisting motions. Brackett arch very valuable for proper extension of leg. Series of thirty cases seen in last ten months all relieved by treatment advocated.

Epidemic Cerebro-Spinal Meningitis. By B. B. Wheeler, McKendree, W. Va. West Virginia Medical Journal, January, 1915, pp. 219-222.

Of the twelve cases reported in the above series ten were given serum; two died. In both of the fatal cases serum was administered late in the disease. One died from lobar pneumonia, the other from nephritis. Of the two cases that serum was not administered one died and the other recovered.

The obscurity of the mode of infection and its transmission Its tendency to occur in the spring of the year, and to follow bad sanitary conditions and to prevail in dark, damp and sunless homes.

The suddenness of the onset, with the marked symptoms of headache, chill, vomiting, pains in back of neck, and the retraction of head, arching of spine, and flexion of legs. Temperature not characteristic.

The small amount of discomfort to the patient, and the rapidity which lumbar puncture can be done, and the efficacy of the serum when administered early in the course of the disease.

The Southern Medical Journal

JOURNAL OF THE
SOUTHERN MEDICAL ASSOCIATION

Incorporating Gulf States Journal of Medicine and Surgery and Mobile Medical and Surgical Journal.

Published monthly at Nashville and Mobile. Price, $3.00 per year; 25 cents per single number.
Address Southern Medical Journal, Suite 905 Van Antwerp Bldg., Mobile, Ala., U. S. A.
Entered as Second Class Matter July 8, 1908, at the Postoffice, Nashville, Tenn.

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OUR INNOVATIONS IN MEDICAL JOURNALISM.

The SOUTHERN MEDICAL JOURNAL, realizing that stagnation means decay, is constantly on the lookout for points wherein improvement and advancement are possible. Therefore the JOURNAL with pride calls the attention of its readers to several radical changes in its make-up, inaugurated with this number.

Beginning with the outer front page the entire space is utilized for the Index of Contents, which has been greatly amplified and is printed in heavy, black-face type, and the titles grouped under six departments, so that the reader may at a glance find the articles in which he is interested. To accomplish this it was necessary to relinquish the advertisement of a valued patron whose monthly announcements have for years occupied the valuable space now devoted to the convenience of our readers in pointing out the location of the matter published within. So rapidly has the amount of material published monthly increased that a competent index thereof required the entire space below our motto: "The Truth and the Truth Only on Every Page from Cover to Cover." A glance at our outside front cover this month reveals not only a much more complete and convenient index, but also a great improvement in the general appearance of the JOURNAL, that is worth all it cost us, which is considerable.

Referring to the literary pages equally fundamental changes will be observed. Departments have been established which cover the entire field of the various lines of work practiced by the medical profession and arranged largely in conformity with the sections adopted in its work by the Southern Medical Association, and indicated by the following headings: 1. Special Articles; 2. Medicine, (Internal Diseases, Neurology, Pediatrics, Diagnostic Methods, etc.); 3. Tropical Diseases and Pub-

lic Health; 4. Surgery, Gynecology, Obstetrics and Genito-Urinary Diseases; 5. Railway Surgery; 6. Eye Ear, Nose and Throat.

But perhaps the most important innovation is the publication, following the original articles in their proper departments, of brief abstracts, by their own authors, of the principal papers that appear from time to time in contemporaneous medical journals, particularly those published in the South; abstracts containing from one hundred to two hundred and fifty words, and supplied upon the invitation of this JOURNAL. The author of a paper is more competent than any one else to extract from it the points most vitally necessary to impart its true meaning, and to express in a few carefully chosen sentences the gist of the whole matter. In this way our readers will get the soul of the article in tabloid form, simplified and condensed, though perhaps at some sacrifice of literary excellence. It is a compliment to any author thus to be invited to present to our readers an abstract of his article published in another journal.

The exigencies of publication will compel the use of small but clear, legible type for these abstracts, more expensive to use but conveying a large amount of information in a small space. In this way, and by publishing the articles read at the Southern Medical Association and their discussions, as well as other articles contributed by members of the association, the Southern Medical Journal aspires to become the Intellectual Clearing House for Southern medical literature. Abstracts and comments will not be entirely confined to literature originating with doctors of the sixteen Southern states and the various branches of the Government Medical Service, but chiefly so. Articles of unusual importance, wheresoever they originate will be duly considered. Inevitably there will appear now and then medical writings too universal in application and too lofty in character to be claimed by any artificially bounded region. Such are for the benefit of the human race and their authors are citizens of the world commissioned by the Almighty to serve humanity. When in our generation such an one arises, as did Jenner and Pasteur, he belongs to all, to us in the South as much as to any other where. But as a general proposition the Southern Medical Journal aims to be the eye, the ear and the voice of Southern medical men. With such a lofty ambition to lead us, the serious financial sacrifice thereby rendered necessary sinks into nothingness and is ignored.

THE SYMPOSIUM ON MALARIA.

In this number of the JOURNAL special stress is laid on malaria. For this there are several reasons. No subject of more importance to the progressive physician can be imagined, viewed from whatsoever standpoint. It is the disease which many physicians see most frequently; a disease that masquerades under more different trains of symptoms that any other in the whole category; and one which is more difficult to actually and permanently cure than most doctors imagine, in spite of the fact that quinine is a specific against the plasmodium malariae. It insidiously saps the energy of its victims, who often repose in fancied security while billions of the parasites are destroying their red blood corpuscles, a false fancy born of the fact that a train of prominent symptoms have been temporarily suspended by an inadequate course of treatment. From the statesman's point of view it is the most formidable barrier to the welfare and progress of his community. Banish malaria from the South and a paradise of health, longevity and prosperity will be established that will make it become recognized as "the land of all the world supremely blessed."

In the light of such a conception some of the most able physicians of the South are devoting their great abilities to the study of malaria from every point of view, and will continue their studies until this master disease shall be as thoroughly vanquished as is now the once dreaded "Vomito" of Cuba, the yellow

fever of insane shotgun quarantines and ludicrous atmospheric disinfection.

In the "Symposium on Malaria," published on other pages of this number of the JOURNAL, are presented the views of some of the most eminent authorities on malaria, some of them known by their work as far as the boundaries of civilization extend. Among those taking part in the discussion were: Surgeon General W. C. Gorgas, U. S. Army; H. R. Carter, U. S. Public Health Service; C. C. Bass, New Orleans, La.; W. H. Deaderick, Hot Springs, Ark.; W. E. Driver, Norfolk, Va.; D. L. Van Dine, Bureau of Entomology, U. S. Department of Agriculture; D. M. Molloy, U. S. Public Health Service; T. E. Wright, Monroe, La.; W. S. Rankin, Raleigh, N. C.; James A. Hayne, Columbia, S. C.; Fred J. Mayer, Opelousas, La., and F. A. Coward, Columbia, S. C.

They are but the vanguard of the army of able men who are devoting their time and their labor to the solution of this problem: How to free their country from the domination of this incubus of disease. The Symposium contains the tentative report of the Committee on Malaria of the Southern Medical Association, a committee whose members are selected from the membership solely on account of their ability to do such research work and their willingness to assume the task. When the combined efforts of such a body are focussed on one particular subject, when the means, the apparatus and the opportunities are at their command, it will be strange indeed if great results do not follow. Already the work of the committee has cleared up some of the dark places in malarial pathology hitherto apparently beyond understanding. The essays of its members have added valuable contributions to the therapeutics of the disease. Every doctor who has read these papers and reports has learned something about malaria, about its phases, its lurking places, its treatment, its prophylaxis, the technic of its diagnosis, *something* about the subject that he did not know before; and the doctor who does not believe this statement is truly a self-satisfied man.

And this is only one stroke out of the many that will be aimed at the arch-enemy of the South, malaria, in the JOURNAL of the Southern Medical Association in the months and years to come. If this periodical achieves no other distinction than that of being the Southern medical periodical whose contributors present the most valuable and authentic studies of malaria, it will not have lived in vain. It has already set the pace in public health work, and it proposes to maintain it.

WORK IN EUROPEAN FIELD HOSPITALS.

Dr. J. Hartwell Deavis, late director of British Field Hospitals for Belgium, and H. S. Soultar, F. R. C. S., Assistant Surgeon West London Hospital, have, in an article published in the British Medical Journal of recent date, described some of the conditions encountered in field hospitals near the front.

Men are brought in who have been lying in muddy trenches for weeks, their clothes sodden and caked with mud and blood, worn out with exposure and insecure sleep. Many of those severely wounded have lain for hours under a heavy bombardment with high explosives at close range. They seem dazed, stupefied, "apathetic to an unusual degree." It is useless to treat the injury until the vital forces have been revived. The patient must be warmed, the circulation restored, and pain and further shock must be prevented. Enemas of strong, hot coffee, hot bottles, the continuous hypodermic infusion of hot saline, and morphine, constitute the "starting point." Such precautions will "carry through a serious operation a patient who, half an hour before, was cold and pulseless." Because they are "dealing with absolutely healthy individuals," their rate of recovery is "amazing." Practically all wounds are septic, the condition being "a pure sapraemia instead of ordinary septicemia." A "black and gangrenous crater" may show no spread

of infection, there may be no rise of temperature, it may become covered with healthy granulations and rapidly heal. Wounds of the abdomen suffered in this war are very different from the clean, penetrating wounds that required no operation, as seen in the Boer war. On the contrary, though the point of entrance may be small and smooth, the condition of the interior shows such fearful and extensive lacerations that both sides accuse each other of using soft, flat nosed, or so-called dum dum bullets. Such wounds in the abdomen must be repaired within six hours or, as a rule, they are fatal. On the other hand, however extensive they be, even to necessitating the loss of twenty feet of intestine, "experience showed that there was no case so desperate that it might not have a chance of recovery." But "it is fatal to wait for the usual signs of intestinal perforation." Every case was operated on at once, the cleanest outside wound sometimes showing frightful internal lacerations, with a cavity filled with blood and fecal matter. Abdominal operations are done under spinal anesthesia, which is supremely satisfactory for this work. Sometimes a whiff of ether is added, to give the patient confidence and for its stimulating effect. The question of hemorrhage is seldom troublesome at first. It has either been slight or has received first aid. Very serious wounds of large arteries seldom reach the hospitals. Cases should be watched lest secondary hemorrhage appear after the heat and circulation are restored. The manner in which the steel pointed bullet produces the effect of a dum dum is explained as follows: The rear end of the missile is of soft lead, and heavier than the front, or pointed end. Any irregular or uneven resistance checks the lighter end more promptly than it does the heavier. The result is that the bullet turns over, and passes on sidewise, or rear end foremost. The soft lead "mushrooms," and the wound inflicted is more extensive and jagged than that made by the blunt, soft-nosed dum dum forbidden by international law.

Another feature, not mentioned in the article referred to, is the constant presence of the germ of tetanus in the mud with which the wounds are caked. For centuries the soil of Belgium has been annually fertilized with everything that would stimulate vegetable growth, and stable manure has been most popular. Not an ounce of it was wasted. Today the fertility that gave life to marvelous farm and garden crops, brings a fearful death to many a brave man. The prophylactic use of antitetanus serum has therefore become a routine measure in the treatment when the wounds cannot be laid open to the air and healed from the bottom by open treatment.

No other misfortune could be greater than a failure of the anti-tetanus serum supply. Anti-typhoid serum is proving as invariably successful in preventing the infection as it did for our own troops along the Mexican border.

Surely this is an era of triumphant medicine and surgery.

THE EFFICIENCY OF ANTI-TYPHOID INOCULATION.

In the British Medical Journal for January 2, appears a brief statement regarding typhoid fever status at the front in France. In this respect it divides the soldiers into three classes: (1) Fully protected men, namely, those who have received two doses of anti-typhoid serum within two years; (2) partly protected men, namely, those who have not been inoculated within two years, or have received only one dose; and (3) those who have never been inoculated.

It is among men of the latter class that all the deaths from typhoid have occurred. Furthermore this class, (3) produced sixteen times as many cases as the fully protected (1) class, and about six times as many as the partly protected (2) class. The attention of those who are opposed to anti-typhoid inoculation is respectfully invited to the above statistics.

NEW USES FOR EMETINE.

From occasional reports it would seem that emetine is as reliable a remedy for some forms of hemorrhage as it is for amebic dysentery. So much has been written of its usefulness in the latter condition that it may be considered established, and reports of its efficiency in pyorrhoea alveolaris are multiplying. But more observations are needed to enable a positive opinion to be reached as to its value as a hemostatic. Several French physicians have used it sucessfully in hemoptisis. Dr. William Sellers controlled with it obstinate bleeding at the gums. Dr. J. P. Prestly found it efficient for nosebleed; and quite recently Dr. Joseph Weinstein, of New York, gives the clinical records of the successful treatment with emetine of twelve cases of hemorrhage following naso-pharyngeal operations. To extend the list it may be stated that Renault, in a recent severe epidemic of Asiatic cholera secured, with emetin, 73 per cent of recoveries. The usual dose is half a grain, hypodermically administered from aseptic ampoules.

THE HARRISON LAW.

On March 1st the Harrison law requiring physicians to register, and to declare on affidavit the amount of habit-forming drugs in their possession, is in force. A fee of one dollar per annum for registration is required. The fee, though small, is certainly unjust, but otherwise the law seems to be a long step in the right direction, for something needs to be done to restrain the growing use of narcotics. In every new law of such a sweeping character there must be imperfections, and this one, no doubt, will require modifications.

One unpleasant possibility is suggested, namely, the blackmail that can be attempted by ex-officials to whom physicians and druggists are bound to show their records of narcotics prescribed. Doctors and druggists are such for life, and both their training and their interests prevent the betrayal of professional confidence. But political officials hold temporary positions, and however they may be restrained while in office, when their terms are over nothing but personal honor will prevent them from using their knowledge dishonestly. Now every doctor knows that everywhere there are unfortunate people who are not what are called "fiends," though their condition requires the daily use of some opiate; people who on account of painful diseases, the infirmities of age, or conditions which, at the beginning required, or received, long continued treatment with opiates, and whose physical condition is such that they cannot stand the treatment necessary for cure. They do not use it as a dissipation; are excellent, reliable citizens, often gradually decreasing their dosage. Such patients are protected by their physicians from the unjust opprobrium a knowledge of their misfortune would entail, and in rare instances they might become a prey to any unprincipaled subordinate examiner, after he had lost his job. Would it not be better to have these records open to inspection only by some regular physician employed by the government, who could judge whether or not the dispensing or prescribing by the druggist or doctor was right and proper, and so report? A few physicians could cover a large area.

However, it is the law, and we as good citizens should promptly comply. So see the collector of revenue in your district, doctor, pay your tax and get your papers. Let us see how the law works before judging it.

THE PUBLIC HEALTH LAWS OF WILMINGTON.

A noteworthy publication which though only one hundred pages in length is a valuable addition to the literature of sanitation has reached this office. It is entitled: "Regulations Governing Health and Sanitation for Hanover County, North Carolina, Including the City of Wilmington and Wrightsville Beach. Prepared and Compiled by Chas. C. Nesbitt, M.D., Health Officer."

Possibly Wilmington has done more than any other Southern city to arouse its public to a consciousness of the enormous importance of the public health to the general welfare and prosperity. Having secured the support of public opinion the Board of Health of Hanover County has proceeded to put into effect the principles they have been inculcating by way of preparation. The publication in question embodies the regulations governing the whole subject of sanitation in that county. The organization is as follows. A Board of Health with a County Health Officer as its Executive Officer. He devotes his entire time to the work and receives a liberal salary. He acts as Registrar of Births and Deaths, makes recommendations to the Board of Health, files all complaints and reports permanently, keeps an indexed record of vital statistics, communicable diseases, violations of regulations, etc. A full-time Assistant is elected by the Board who also acts as Quarantine Officer. They have a laboratory with a director and trained and skilled chemists and bacteriologists, who report upon the purity of waters, beverages, and foodstuffs, and have charge of the operation of purifying the city water. There is a Sanitary Engineer who has charge of the lighting, heating and ventilation of public buildings and has supervision over a "Plumbing Inspector," appointed by the Board of Health, who is skilled in plumbing and drainage, and who is not engaged in any business of the kind or has any connection with such business. There is also a Meat and Milk Inspector; and a Sanitary Police to operate the regulations. The County of Hanover and City of Wilmington are divided into such sanitary districts as is deemed advisable by the Board. No arrangements and no machinery seem to be lacking to carry out these regulations, which all the citizens are required to observe. The distribution of samples of medicines in halls, alleys, streets or other public places or to any child under twelve years of age is prohibited in the county. Passenger cars must be disinfected and no common cups, glasses or towels are allowed. Among the reportable diseases are malarial, infantile diarrhoea with marasmus, and chickenpox. Where there is no doctor the nurse or the head of the family must make the report. These are but a few of the items prescribed in this most admirable code. It is difficult to conceive how it could be better constructed to serve its purpose. There are few counties in any state that may not learn something to their advantage by a careful study of its pages.

A NOTABLE ADDITION TO THE GROWING NUMBER OF MEDICAL JOURNALS THAT PUBLISH NONE BUT ETHICAL ADVERTISEMENTS.

One of the oldest and most conservative medical publications in this country, "The American Journal of the Medical Sciences," will hereafter publish no advertisements of proprietary medicines that have not the approval of the editor.

The addition of this widely read medical journal to the ranks of those which have been struggling to elevate the standard of therapeutics and to protect the profession from wholesale imposition, is a great encouragement to those who have adopted this policy in the past. When some five years ago this JOURNAL adopted the same policy and refused to renew or accept the advertisements of many of its most liberally paying patrons, it occupied a lonely position in the wide field of monthly medical literature, only two or three such contemporaries having taken this advanced stand. Today quite a number of our standard journals have purged their advertising pages of deceiving advertisements of proprietary medicines, and more must follow their lead. The doctors are beginning to see that in too many instances they have accepted untrue statements and fake analyses because of their faith in the sponsors, the respectable journals that published them; and realizing the deception they resent it. It is indeed an encouraging sign when a journal

of such dignity and influence as "The American Journal of the Medical Sciences" adopts a policy that leads to our own tersely stated principles: "The Truth and the Truth Only, on Every Page From Cover to Cover."

A COMPLIMENT TO OUR MEDICAL NEWS.

THE SOUTHERN MEDICAL JOURNAL has received an unusual compliment. In our January issue we published, as usual, the current Medical News of the sixteen Southern States. Judge of our delight when we found in a medical journal practically a complete copy of our news of nine states, with only a few items or so added or omitted. With these exceptions it was literatim et punctatum the same. Further investigation showed that the January number was not the first of our issues thus copied.

In one respect the transactions are a little irregular, in that the journal in question has regularly failed to state that a large part of its news was copied from the SOUTHERN MEDICAL JOURNAL. Of course we recognize that this omission was entirely accidental. The editors of the publication in question would not intentionally make such a mistake. The use of our "News" for the benefit of readers of other journals is all right, but we beg editors to give us proper credit when using our forms and verbiage. We would not mention this matter at all were it not possible for some to think that the SOUTHERN MEDICAL JOURNAL copies its news from other journals.

REASONS WHY DOCTORS SHOULD READ ADVERTISEMENTS IN STRICTLY ETHICAL JOURNALS.

The foundation truths of medicine and surgery are embalmed in the text-books and monographs. The results of constant research and study are told in periodical medical literature. The improved accessories, such as new compounds, instruments and furniture are described in the advertising pages of standard medical journals. Those advertisements, when guarded by rules like ours, are guides to safe and necessary investments, safe because so inspected, necessary because no enterprising physician can afford to ignore or neglect the valuable improvements and facilities offered by accepted advertisers. So read our advertisements, Doctor, and send a postal asking for descriptive literature, not forgetting to mention the JOURNAL. It will help both you and us.

CORRESPONDENCE

WARM OR COLD AIR IN PNEUMONIA, WHICH?

Fort Worth, Texas, February 1, 1915.

Editor Southern Medical Journal:

The editorial in your January issue under the head, "A Medical Juggernaut,' struck a sympathetic chord in my breast. The much that has been said and written on the benefits of cold air, out-door treatment of pneumonia, has caused me many times to review my own work, now reaching almost forty-nine years.

Notwithstanding this ex-cathedra teaching and the fact that five years ago I saw at Johns Hopkins Hospital pneumonia patients in bed on the porches when the snow covered the ground, I have never been able to so far ignore my own observations and conclusions as to be willing to reduce the temperature of the sick room to less than 65 degrees F. How much warmer I don't care, except for the comfort of the patient.

My first strong impression on this subject was made about the year 1870. I rode about seven miles facing a "norther," to see J. F., who had pneumonia. His house was a one-story box house, without ceiling, canvass or paper. The house having been built several years, the planks were warped and drawn so that the air came in freely through walls and roof. The patient had an al-

most incessant cough, with entire absence of expectoration. The bed stood near the middle of the room, but rather away from the fire. To protect him from the wind (incidentally from the fire also) sheets had been stretched all around the bed.

The fireplace in which was a roaring fire was in the north end of the room, with the width of the bed between it and the east wall. Under my direction a sheet was tacked up in this space from joist to floor; another connecting with this was tacked on the east wall. A wagon sheet was then tacked to the overhead joist of the north wall, the bed slipped in with head to north and the wagon sheet, after passing over one or two joists, dropped over the foot of the bed. Thus he was protected on the north, east and south sides and overhead. The fire was throwing its heat against the wagon sheet, which, on account of its obliquity, reflected the heat into the patient's face. The change was like magic. In twenty minutes the distressing cough was gone, and in its stead an easy cough, which brought a free expectoration. The patient was never so bad afterwards and went on to easy convalescence. I have always thought the warm air was responsible for the improvement.

Some ten years later Mr. S. H. had pneumonia, and seemed to be doing very well. I hung a thermometer at the head of his bed with instructions to move the bed up to the fire if the thermometer could not be kept up to 60 degrees. I went off, was gone twelve or fifteen hours, and found on my return the mercury at 40 degrees, and my patient "gone to pieces." Expectoration had stopped and he was drowning in his own secretions. He died.

One or two years later I was called to see this man's daughter in the same room. Her mother met me at the door; her eyes showed that she had been crying, and said, "Molly has pneumonia." I found the bed as far away from the fire as the size of the room would allow. I remarked, "I never allow anyone to sit between my patient and the fire," and the bed was at once moved close up in front of the fire. In the next few hours, without antipyretic medication, her temperature fell two degrees and did not again rise.

A little boy of J. H. had pneumonia during very cold weather in a very open house. His bed was put so close to the fire that his face had to be protected from the heat by a towel hung on a chair. He found the hot air so comfortable that his mother repeatedly had to move him back to keep him from falling off the fire side of the bed.

With these memories I cannot think a cold air is a sine qua non.

A few years ago, during a spell of weather when for about a week the diurnal range of the thermometer was from 75 degrees to 102, 3 or 4, Mrs. F. had a chill at 3 a.m., during labor, and at 10 the baby was born. She was in a little one-story house, with no protection from the sun. I made my diagnosis of pneumonia in the afternoon. If cold air is necessary, this woman ought to have died. She did not, but under the influence of creosot carbonate (twenty-six and two-thirds minims every three hours) and collargolum (three grains three times a day), her temperature almost reached normal in about sixty hours, and did not rise again.

I am thankful to Dr. Wilson for starting the ball rolling and to the Editor of the Southern Medical Journal for giving it a shove. Let the good work go on.

I. L. VAN ZANDT, M.D.

658 Henderson St.

DOCTORS—BEWARE!

Dr. W. B. Thorning, Editor South Texas Medical Record, Houston, Texas, sends us the following notice, which we take great pleasure in publishing. We advise our readers to "beware."

"Houston physicians have had the privilege of entertaining a very polished young gentleman giving the name of Jules Hanaford.

"In a most fluent and convincing manner he claimed to represent the American Institute of Medical Research of Indianapolis, Ind., which, for the small stipend of five dollars ($5.00) per annum would supply all subscribers upon request with abstracts, original articles, etc., of the medical literature of the world in a very short time after its publication.

"He named as sponsors for this bureau of information Dr. Harvey A. Moore, Dr. J. Rilus Eastman and Dr. E. E. Wishard, of Indianapolis.

"These well known names enabled him to secure many subscribers at $5.00 per, but, unfortunately, letters mailed to the above 'Institute' are returned marked, 'Not in the directory.'

A letter of inquiry was addressed to Dr. Harvey A. Moore, who replied that he had no knowledge of any such information bureau, but that he had received numerous letters from different parts of the country asking for information concerning it.

"A word to the wise is sufficient."

BOOK REVIEWS

The Clarion.

By Samuel Hopkins Adams. With illustrations by W. D. Stevens. Houghton Mifflin Company, Boston and New York.

This book might be called the greatest effort in the literary career of Mr. Adams. He is well known by his writings to the American public especially upon public hygiene and sanitation, through the pages of "McClure's," this being the first systematic effort of importance towards popular education on health topics.

His articles on the same subject, notably in "Colliers Weekly," have constituted him the champion health writer. Other leading periodicals have published serial articles by him. The American Medical Association, at its meeting in 1913, honored Mr. Adams with an associate fellowship in recognition of his efforts to promote the public health by the suppression of quackery. He has also made a special study of fraudulent advertising, both medical and non-medical, and in this latest book he has attacked both quackery and fraudulent advertising.

He introduces as one of the leading characters a lovable old quack who is full of generous impulses, is charitable to the poor, is worshipped by all of his employes. He has made an immense fortune by selling worthless quack medicines of his own manufacture, which he has advertised with a genius that insured success and yet avoided criminal prosecution. His son returns from Europe full of lofty ideals. The "yellow" newspaper in his town, the Clarion, attacks his father personally because he gives them none of his advertising. The son goes to the editor's office armed with a horsewhip, but meets there a powerful opponent armed with a knobby stick like a bludgeon. The young man tells the editor that he has too much sense to run against such a proposition but will find some other way to get even. He at once goes to the owners of the Clarion and buys it, lock, stock and barrel. He takes possession, makes friends with the man with the stick, and together they start out to make it a clean, honest newspaper. The story goes on to show how the business interests of the town through their control of advertising have been able to muzzle every paper in town. When the Clarion rebels, and prints true accounts of sickness that might deter people from visiting the town, tells of the reckless driving of the daughter of the biggest business man in town all the leading advertisers cancel their contracts and withdraw their advertising. Hardships and trials multiply. His sweetheart is estranged, a coldness between himself and his father drives him to a hotel; there is a mob and a dynamite explosion, yet in spite of all obstacles the Clarion survives and conquers.

The story ends in the good old way which punishes the vicious, and rewards the good with love and prosperity. The story has a grip to it that makes it hard to lay it down unfinished. Mr. Adams will have to exert himself very much if he ever does anything better than "The Clarion."

Anoci-Association.

By George W. Crile, M.D., Professor of Surgery, School of Medicine, Western Reserve University, Visiting Surgeon to the Lakeside Hospital, Cleveland, and William E. Lower, M.D., Assistant Professor of Genito-Urinary Surgery, School of Medicine, Western Reserve University, Associate Surgeon to the Lakeside Hospital, Cleveland. Edited by Amy F. Rowland. Original Illustrations. Philadelphia and London. W. B. Saunders Company, 1914.

This is a perfect gem of a book, containing 259 pages made up in a most substantial and artistic manner. Type, paper, binding and finish are above criticism. It abounds in full-page illustrations executed in the most delicate, clear and illuminating manner so perfectly adapted to the text that only by being actually present at the work described could the reader improve upon the whole as a means of instruction. The first part of the book is devoted to "The Kinetic Theory of Shock," its histological and clinical pathology, and the principal factors producing it. The second and largest part deals with the treatment of shock and its prevention through anoci-association. The principles and technic of anoci-association are minutely detailed in abdominal operations, gynecologic operations, genito-urinary operations, in the treatment of exophthalmic goiter, etc. In an appendix the technic of nitrous-oxid-oxygen anesthesia is carefully described. The above indicates only a few of the points of excellence of this timely book. It is enough to say that it displays the same mastery of detail in its composition that is seen in the actual work of these eminent surgeons, and the subject is one of the most important that has demanded the attention of the modern surgeon for many years.

A Text-Book of Diseases of the Nose and Throat.

By D. Braden Kyle, A.M., M.D., Professor of Laryngology and Rhinology, Jefferson Medical College, Philadelphia. Fifth edition, thoroughly revised and enlarged. Octavo of 856 pages with 272 illustrations, 27 of them in colors. Philadelphia and London: W. B. Saunders Company, 1914. Cloth, $4.50 net.

In the fifth edition of Kyle's well known textbook, the author has, as in former editions, written for the student and general practitioner, as well as for the specialist. The grouping of diseases according to the pathological alterations arising therefrom has many advantages, and the endeavor to make every chapter complete in itself, enables the reader to find readily whatever he may be looking for under the heading of any given subject. The book has much to recommend it.

SOUTHERN MEDICAL NEWS

ALABAMA.

At Mobile there is a movement to introduce nurses into the public schools to assist in the work of the physician-inspector.

The Montgomery Advertiser of January 30th prints a telegram from Gadsden, which states that the smallpox epidemic which has prevailed at Chattanooga for several months is spreading to other towns, and is causing alarm in every town in North Alabama, North Georgia and Middle Tennessee. Cases were reported to exist at Birmingham and Athens, Alabama.

The Birmingham News of January 27th reported six cases of smallpox in Birmingham and vicinity. Four of the cases were in Pratt City and the other two in the suburbs. The Birmingham health authorities advise that everyone in the city be vaccinated.

Dr. Earle Drennen, who left Birmingham November 1st, to serve under Dr. Joseph Blake as surgeon in one of the American emergency hospitals in Paris, has been appointed chief surgeon of the American hospital work in France, during the absence of Dr. Blake on leave. He is in charge of the four hospitals constituting this group.

The State Board of Health, with the County Board of Health of Montgomery County, and the County Board of Commissioners, have inaugurated a public health campaign in Montgomery County. It consists of free, illustrated, stereopticon lectures, covering the subjects of such preventable diseases as typhoid fever, malaria, cholera infantum, pellagra and hookworm disease. Free examination and treatment for hookworm are presented at each lecture.

At a neighborhood a little over seven miles southwest of Athens it is reported that there have been twenty cases of smallpox, with one death. Most of the cases were very mild. The disease was brought from Texas by a white visitor.

An epidemic of typhoid fever was said to be raging around Decatur in the early part of February. Dr. E. M. Duncan, City Bacteriologist of Birmingham, has analyzed the city water and found it free of typhoid germs.

Deaths.

Dr. Robert Dandridge Jackson, of Jefferson County, died at Orrville, December 20th. He was a surgeon in the Confederate service through the Civil war.

Dr. J. A. McEachern died at his home in Brundige, January 5th, from heart disease.

Dr. E. Z. F. Golden, of Langdale, died at his home December 24th, aged 26 years.

ARKANSAS.

Dean Morgan Smith asked the Legislature to appropriate sufficient money to provide hospital facilities and laboratories to raise the standard of the Medical Department of the University of Arkansas so that it can be given a class "A" rating by the Council on Medical Education of the American Medical Association. He estimates that the sum of $96,928 is needed for the purpose. He considers an "Arkansas General Hospital" indispensable.

Dr. Milton Vaughan, City Health Officer of Little Rock, reports the deaths for December as follows: Pneumonia, 20; tuberculosis, 13; pellagra, 9; heart disease, 7. Infectious diseases: Smallpox, 4; diphtheria, 12; scarlet fever, 3; measles, 2; chickenpox, 3, and typhoid fever, 3.

Senator Horace E. Ruff, of Heber Springs, has introduced a bill to abolish the office of county physician and the county board of health. He would give the county judge power to name a county physician, whose duties will be to take care of all the county's health matters. Up to this time the appointment has been made by the State Board of Health.

Dr. J. L. Greene, formerly connected with the State Hospital for Nervous Diseases, at Little Rock, has moved to Hot Springs, Arkansas.

Deaths.

At Bentonville, January 26th, Dr. James William Sutherland, aged 84. He leaves a wife and six children.

FLORIDA.

Vital statistics show that there were 22 fewer deaths in January, 1915, than in January, 1914, in the city of Jacksonville.

Dr. C. W. Bartlett, State Health Officer for Tampa, has called the attention of the mayor to the need of an ordinance compelling vessels mooring at the Tampa docks to use rat guards.

At Miami the City Board of Health is issuing permits to retail dealers to sell milk in compliance with the milk ordinance. All persons who desire to sell milk by retail are required to procure such permits.

Deaths.

Dr. Calvin S. Parker, a retired physician of St. Augustine, died February 1st, after a long illness, aged 59 years. He leaves a widow.

GEORGIA.

Dr. Frederick Giffith, of Eatonton, has been appointed county physician for Putnam County, to fill the vacancy caused by the resignation of Dr. J. D. Weaver.

The Thomas County Medical Society has elected the following officers: President, Dr. J. N. Isler; Vice-President, Dr. J. D. Palmer; Secretary-Treasurer, Dr. L. S. Cheshire.

The State Board of Health is hampered in its operations by the failure of the legislature to make any appropriation for its support. It is estimated that from $20,000 to $30,000 are necessary.

The Georgia Medical Society will meet at Macon April 16-17-18. The Macon Medical Society is busy making preparations.

At Thomasville, Dr. B. A. Daniels has been re-elected Chief of the City Health Department. Sanitary Inspector S. P. Doss was again appointed marshal.

An ordinance passed by the city council of Rome seeks to prohibit any person entering Rome

without certificates that they have not been in territory infected by smallpox within twenty days.

The trustees of the Grady Hospital of Atlanta have increased the number of the medical staff from the city at large from 7 to 14.

There are three doctors applying for each of the seven new positions created by the trustees of Grady Hospital. The trustees have found themselves the center of seven separate political contests.

The third regular meeting of the Georgia Surgeons' Club met at Atlanta February 25-26. The officers are: Dr. E. C. Davis, Atlanta, President; Dr. T. J. McArthur, Cordele, Vice-President; Dr. R. M. Harbin, Rome, Secretary-Treasurer. A large and attractive programme was presented.

Deaths.

Dr. Joseph Eve Allen, for many years dean of the medical profession in Augusta, died at his home January 19th, aged 56 years.

KENTUCKY.

The State Board of Health held its annual meeting in Louisville, at the Seelbach Hotel, January 15th. Dr. W. L. Heizer, of Bowling Green, State Registrar of Vital Statistics, and Dr. Lillian South, of Bowling Green, State Bacteriologist, were re-elected for terms of four years. Twelve physicians have successfully passed the State Board of Medical Examiners during the year.

The Hardin County Medical Society has elected the following officers: President, Dr. J. F. Glasscock, Sonora; Vice-President, Dr. J. C. Mobley, Elizabethtown; Secretary-Treasurer, Dr. R. F. Layman, Cecilia.

At Bowling Green the County Board of Health elected Dr. E. M. Hall President and Dr. Hal Neel County Health Officer.

Dr. Thomas C. Holloway, of Lexington, has recovered from his recent illness and resumed his practice.

At Shelbyville a partnership has been formed by Dr. W. T. Buckner and Dr. A. C. Weakley, for the practice of medicine.

At Louisville, according to the City Health Department, the deaths from pneumonia to date, January 20th, have increased 30 per cent over the same period for last year. The board warns against over exertion from dancing in hot, close rooms, and breathing the gases generated by gas stoves.

At Paducah the Board of Commissioners directed Commissioner of Safety Burns to strictly enforce the dog license ordinance in view of the prevalence of rabies.

At Versailles, as the result of an examination made by order of the State Board of Health, a dozen pupils in the public school have been found to be affected with trachoma and dismissed by the Board of Education until their eyes have been properly treated.

At Louisville the mayor has declared that there were only 23 cases of smallpox in the city, and those of so mild a character that they could conceal their infection. This makes it all the more urgent that all citizens should be vaccinated.

From Whitesburg comes a report that in Blackwood, a little mining town, an epidemic of cerebro-spinal meningitis in a malignant form is prevailing. Numerous deaths have occurred.

Deaths.

Dr. J. W. Martin, of Ashland, died February 16, aged 87 years. Until his retirement ten years ago he was a successful and popular physician and surgeon, having practiced in Ashland for nearly half a century. Through the civil war he served as surgeon in the Fourteenth Kentucky Regiment. One of his sons, Dr. H. H. Martin, of Savannah, Ga., was the first president of the Southern Medical Association, and is now chairman of the Council of that association.

On February 4th, Dr. Dudley S. Reynolds, founder of the Old Hospital College of Medicine, and ex-President of the American Medical Association, the Southern Surgical Association, the Ohio Valley Medical Association, and the Jefferson County Medical Society, died suddenly of angina pectoris at his country home in Pleasure Ridge Park, aged 72 years. He leaves a widow, a son and a daughter.

Dr. Edward Maxwell Wiley, of Lexington, died at his home, 149 Woodlawn Avenue, aged 64 years. He was a graduate of the Medical College of Indiana at Indianapolis. For four years he was Superintendent of the Eastern Kentucky State Hospital at Lexington. His death followed an operation for hypernephroma of the left kidney.

At Somerset, Dr. Isaac S. Warren died at his home, January 16th, after a brief illness.

At Elizabethtown, January 28th, Dr. Charles Addis died at his home at Raineyville, aged 36 years. He leaves a widow and six children.

Dr. J. M. Bodine, a prominent physician of Louisville, died from senile debility, aged 83. He served many years as President of the University of Louisville, five years as President of the Association of American Medical Colleges, and 45 years as professor of anatomy.

Dr. I. S. Warren, Health Officer of Somerset, died from an operation for malignant disease. His age was 59 years.

LOUISIANA.

It is announced that Dr. Paul J. Landry, a senior interne attached to Charity Hospital, and who has been mysteriously absent for two weeks, was spending the time with a wife to whom he had been secretly married nine months ago. The bride was Miss Willie Walters, of Vicksburg, Miss.

District Attorney Hunter was instructed by Dr. Oscar Dowling to file injunction proceedings against L. M. Burnam, manager for the T. P. A. Hotel, of Alexandria, restraining him from operating the hotel until the requirements of the State Board of Health had been complied with.

The East Baton Rouge Parish Medical Society elected the following officers: President, Dr. A. S. J. Hyde; Vice-President, Dr. Thomas Spec Jones; Secretary-Treasurer, Dr. Thomas H. Wilson.

At Monroe, January 20th, the Fifth District Medical Society organized, with representative physicians from practically every parish in the Fifth Congressional District. The society is affiliated with the Louisiana State Medical Society. The following officers were elected: President, Dr. Gaines, of Tallulah; First Vice-President, Dr.

(Continued on page xx.)

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Large Package 25c
Regular Package 10c
Except in far West and South

The Quaker Oats Company
Chicago

(832)

(Continued from page 252.)

V. J. Funderburk, of Monroe; Second Vice-President, Dr. Alverson, of Newelton; Third Vice-President, Dr. Rutledge, of Ruston; Secretary-Treasurer, Dr. J. B. Vaughan, of Collinston.

Frederic G. Beck, retail grocer on Iberville St., New Orleans, obstructed the operation of the rat-proofing law and was sentenced in the Second Recorder's Court to improve his establishment and pay a fine of $20.

In New Orleans agents of the Board of Health have been making purchases from stores in various parts of the city, and the actual weight of the food sold ascertained. It was found that practically all the stores from which food was bought averaged a shortage of about one ounce to the pound on the goods sold. One or two came up to the requirements, while some of the weights given were only 14 1-2 ounces to the pound.

Dr. B. H. Talbot has moved from Dodson to Rushton.

MARYLAND.

Federal regulations of the quarantine against foot and mouth disease in the counties of Caroline, Calvert and Queene Anne's have been considerably modified from January 15th. The change allows interstate shipping of live stock for immediate slaughter, without inspection, outside of a three-mile zone from infected farms.

The Baltimore County Medical Society elected the following officers: President, Dr. Lewis H. Gundry, of Relay; Vice-President, Dr. J. Carroll Monmonier, Catonsville; Secretary, Dr. Martin F. Sloan, Towson; Treasurer, Dr. F. C. Eldred, Sparrows Point.

Deaths.

At Baltimore, January 22nd, Dr A. Trego Shertzer, a retired surgeon of the United States Navy, and a practicing physician of Baltimore, died suddenly at his home, 25 West Preston Street, from heart trouble. His age was 71 years. He leaves a widow, a son and a daughter. He was a graduate of the University of Maryland. He served under the Prussian flag in the war of 1870-1871, and for his services received a silver medal from the Prussian government, a gold medal from the Hospital Commission of the German Empire, and the Iron Cross of Prussia.

Ralph Walsh, M.D., for 35 years connected with the National Vaccine and Antitoxin Laboratory, died at his home in Jerusalem January 15th, from paralysis, aged 73 years.

Dr. Lloyd L. Edgell, member of the West Virginia Medical Association, died at his home in Cumberland, January 18th, aged 55 years.

MISSISSIPPI.

The Board of Trustees of the Tuberculosis Hospital has elected Dr. H. F. Tatum President and Mr. Frank Humphries Secretary-Treasurer.

At Natchez, Dr. R. D. Sessions, City Health Officer, underwent an operation for appendicitis January 15th, which was successful.

Dr. E. H. Galloway, of the State Board of Health, has issued a circular letter to the county health officers announcing the appearance of smallpox in several counties and urging them to take stringent measures to prevent its spreading wherever it appears. He says, "Compulsory vaccination is, of course, our only protection."

Dr. Willis Walley, chief sanitary inspector of the state, is taking strong ground to secure the cleaning up of the unsatisfactory jails in the various counties.

The Pasteur Institute at Jackson, established at the headquarters of the State Board of Health, had on January 9th 17 patients taking treatment for rabies. Nearly every day brings in patients. The treatment is administered free of cost, the material being sent to the board by the United States Government.

The State Board of Health requires all hotels and restaurants to screen all openings used for entranceways all the year round. Hotels of forty or more rooms are required to screen the entrances to halls and corridors and to chimneys and flues when they are not in use. The secretary was authorized to appoint a health officer for Webster County.

At Biloxi several arrests have been made of merchants who have neglected to comply with the sanitary laws.

At Jackson twelve residents of the city have offered themselves to the state authorities to allow the Board of Health to conduct a series of experiments seeking the cause and cure of pellagra. They will be inoculated with the germs and then take treatment with wholesome food and other methods recommended to produce a cure.

Dr. E. H. Galloway, of the State Board of Health, warns the County Health Officers of the wide spread of rabies. He states that in Mississippi it already covers an area of about 20,000 square miles, and if something is not done at once it will likely spread over the entire state. He advocates the muzzling of all dogs and the killing of those running about without muzzles.

The Lauderdale County Medical Society has elected the following officers: President, Dr. K. T. Klein; Vice-President, Dr. A. W. Pigford; Secretary-Treasurer, Dr. G. F. Douglas (re-elected).

Deaths.

At Biloxi, Dr. J. J. Lemon, one of the oldest physicians in the state, died at his home, aged 90 years.

At Hattiesburg, Dr. I. H. Cook died at his home January 22nd, aged 63 years. He was a graduate of the Louisville Medical College in 1875.

NORTH CAROLINA.

At Charlotte, January 23rd, Dr. Llewellyn Franklin Barker, of Johns Hopkins University, gave an illustrated lecture at the Selwyn Hotel to the Mecklenburg Medical Society, on the subject of "Glands of Internal Secretion." A smoker and Dutch luncheon followed the lecture.

Dr. Clarence M. Peeler, formerly of the faculty of the North Carolina Medical College, has located in Charlotte permanently. He will make diseases of the eye, ear, nose and throat his specialty.

At Winston-Salem, January 19th, at a special meeting of the board of aldermen, a communication was received from the Winston-Salem Medical Society, endorsing the establishment of a city health department, but protesting against the appointment of Mr. Hubert Jenkins, of California.

(Continued on page xxii.

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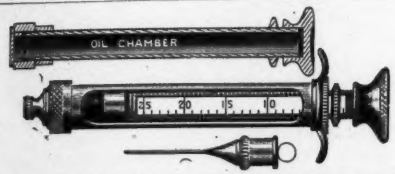

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as its head, on the ground that Mr. Jenkins is not a graduate in medicine. Action by the board was deferred.

Dr. W. L. Grimes, a native of Lexington, and for the past four years a surgeon at the Union Protestant Infirmary at Baltimore, has decided to locate in Winston-Salem. His office it at room 401 Masonic Temple. Dr. Grimes is a graduate of the University of North Carolina.

At Wilson the local sanitary officers announce that they have control of all cases of smallpox in town, and that all danger of a spread of the disease has passed.

Dr. Eugene B. Glenn, of Asheville, has gained a victory in the Haywood County Superior Court in the case in which Mrs. Amelia Hoke and R. L. Hoke, of Canton, sued to recover $20,000 damages, claiming that while she was a patient Dr. Glenn operated upon her and left a piece of gauze in her body. Dr. Glenn proved that no such gauze was ever used in that operation, and the hospital's witnesses testified that none of it was used in the operating room on the day of the operation. Dr. Glenn was allowed his claim for $150 for professional services.

At Kinston the recent tuberculin tests administered to every cow whose milk comes into the city showed that several of the animals were infected. They were immediately isolated.

At Fayetteville City and County Health Officer Dr. J. W. McNeill has condemned the meat market in unmeasured terms. He has ordered City Attorney R. B. Dye to give the meat dealers in the market 30 or 60 days' notice to clean up or vacate.

On January 20th the City Health Department of Raleigh reported three cases of smallpox. Two were found in the extreme southern portion of the city. The third entered the offices of the City Health Department, where his condition was promptly recognized and he was sent to quarantine with the other two cases.

At Newton, Dr. George Shipp has been appointed County Physician by the County Board of Health. He is not a full-time officer.

Death.

Dr. C. J. Paleir, of Blowing Rock, died December 16th from arteriosclerosis.

OKLAHOMA.

The system of school inspection in Oklahoma City has proven so successful that R. H. Wilson, State Superintendent of Education, contemplates having introduced into the legislature a bill providing for the physical examination of all the school children of the state.

Dr. J. W. Duke, Guthrie, has assumed the duties of State Health Commissioner, succeeding Dr. J. C. Mahr. Dr. Duke expects to remove the Health Department from Oklahoma City to Guthrie.

Dr. G. Pinnell, of Mangum, has located in Lawton.

Dr. R. W. Pence has moved from Jet, Okla., to Cedar Rapids, Iowa.

The Oklahoma County Medical Society has donated $50 to the Belgian Physicians' Relief Fund.

At Muskogee, January 21st, the Federal Court was abruptly adjourned when it was found that one of the jurors had smallpox. The patient had served two weeks on the jury. When he asked to be excused on account of illness the physician who examined him recognized the disease. Another case of smallpox was discovered January 29th at the federal jail. All prisoners in the jail had been vaccinated a week before.

It is said that a smallpox epidemic is prevailing in Locust Grove, Mayes County. The report is that sixty of the 600 inhabitants have well developed cases and no effort at segregation was being made. The State Health Department was urged to send "Pete" Beiwer, state smallpox specialist, to the place to manage the disease.

Death.

Dr. P. C. Woodruff reecntly died at his home in Stilwell. Age not reported.

SOUTH CAROLINA.

At Chester, Drs. S. W. Pryor, H. B. Malone, G. A. Hennies and R. H. McFadden have assumed charge of Magdalene Hospital.

At Hendersonville the city commissioners have employed Dr. J. Frank Cranford whole-time health officer for Hendersonville. Dr. Cranford agrees to visit the slaughter house and meat markets twice a week, to make bacteriological tests of the milk from each dairy once a month, and to visit the dairies when necessary.

At Manning, the Clarendon County Medical Society elected the following officers: President, Dr. Charles H. Geiger; Vice-President, Dr. A. S. Todd; Secretary-Treasurer, Dr. R. E. Broadway, of Davis Station.

The doctors of Spartanburg have been reminded by Secretary Copes, of the board of health, that any failure on their part to promptly report all cases of infectious or contagious diseases renders the delinquent liable to fine or imprisonment, and that from now on the state and city authorities propose to enforce the law.

At Columbia over 1,000 persons have registered as visitors at the tuberculosis exhibit, which closed January 30th, after having been open for five days.

At Charleston the board of health is arresting bakers' wagons and their drivers that are found delivering unwrapped bread.

Death.

Dr. Rufus Franklin Smith, of Columbus, died at his home February 3rd, aged 56 years. He was a graduate of the School of Medicine of the University of Virginia. He abandoned the practice of medicine in 1900. He leaves a widow and six children.

TENNESSEE.

At Chattanooga, Commissioner Evans, during the latter part of January, kept three physicians busy all the time vaccinating the people who applied for free vaccination. On January 15th the health officials stated that there were only nineteen cases of smallpox in Hamilton County. Of these fifteen are in the city and four in the country. All were under quarantine. Surgeon R. H. Creel, of the U. S. P. H. Service, after thorough investigation, reported to Surgeon-General Blue that there was no evidence of plague in Chattanooga, and that the total cases of smallpox up

(Continued on page xxiv.)

Effective February 1

Reduction No. 3
On Goodyear Tires

Making Total Reductions 45 Per Cent in Two Years To Give Always the Most for the Money

We are glad again—for the third time in two years—to announce a big reduction on Goodyear tires, effective February 1st.

Goodyear policy on price is to give the utmost in a tire at the lowest possible profit. Our reductions are made to that end, without ever reducing the quality.

That always means, with our matchless output, more for the money than any other maker can give.

As rubber came down our prices came down. As our output multiplied, reducing factory cost, our prices came down with it. In two years our reductions—including the present—have totaled 45 per cent.

Last year we increased our output 26.6 per cent. A few days ago the embargo on rubber was modified so that supplies seem assured. The market price for rubber seems for a time established. Fabric costs less than last year. So, under our minimum profit policy, we announce this new reduction.

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We consider profit margin on a tire the only fair price basis. We keep that margin just as low as our line allows.

While we do that, Goodyear tires will always undersell any tires that compare with them. That is because we have the largest output. We have a new factory, modernly equipped. And we have world-wide facilities for buying rubber, of our extra grade, at the lowest market price.

For a long, long time most tires have sold much above Goodyear prices. Some have sold one-third higher. A few have sold lower, as some always will, because of less rubber, less quality. But we can and do, under all conditions, give more for the money than any rival tire can offer.

The Best We Know

Goodyear Fortified Tires offer the best we know. They are built to give you the lowest cost per mile. They minimize tire trouble in five costly ways employed by no other maker. And they are always the same, regardless of price reductions.

Most tires will always sell higher, because of smaller output. Some tires will always sell lower because of lower standards. But we promise you that none will ever give better than Goodyear value.

This policy has made Goodyears the largest-selling tires in the world. It will make them more so as men find them out.

Ask your Goodyear dealer for our new price on the size you buy.

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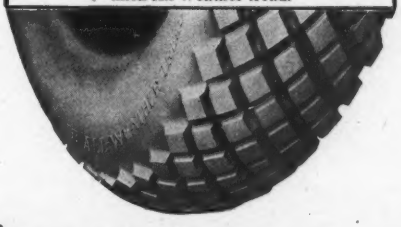

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to January 15th was 56, with 16 deaths. The situation was not alarming and vaccination was extensively employed. Surgeon Creel did not rely upon the statements or records of the city for his information, but made a personal examination. He declared the quarantines of neighboring towns against Chattanooga unjustifiable and their refusal to accept certificates of immunity from the local health department an outrage. The street railway officials have appealed to Judge Cummings to forbid physicians attending smallpox cases from riding on the cars. Patrons are afraid to ride with them. Compulsory vaccination is enforced throughout the city and county, including every man, woman and child. Over 60,000 vaccinations have been done in the city alone. Records show that not a single case has occurred in a vaccinated person.

Knoxville.—A campaign of vaccination of school children, teachers and janitors was begun January 20th. A free clinic for the school children of the city has been recommended by the medical inspectors. The physicians in the city report to the health authorities that they are all kept busy vaccinating the people and children.

Dr. R. Q. Lillard, executive officer, State Board of Health, reports that Knoxville has a splendid water supply system.

Word comes from Cheatham County that smallpox has made its appearance there. Several mild cases were found among some white families near Ashland.

From Manchester comes news that the County Board of Health has placed the entire Twelfth Civil District, where one death occurred from smallpox, under strict quarantine.

A bill has been introduced into the legislature making it unlawful for any child having tuberculosis to attend the public schools, or for any person suffering from the disease to be employed as a teacher in any public school of this state.

The Sumner County Medical Society elected the following officers: President, Dr. R. N. Buchanan; Vice-President, Dr. B. S. Galbraith; Secretary-Treasurer, Dr. J. R. Parker.

The Tennessee State Medical Society meets in Nashville next April.

The Southern Pharmaceutical Company, Nashville, is preparing to manufacture vaccines. The concern has over a million dollars capital.

Deaths.

At Memphis, Wednesday, January 13th, Dr. William Boddie Rogers died at his home after a lingering illness, aged 58 years. He was prominent as a physician and citizen. His father conceived the idea of the Memphis Hospital Medical College in 1878, but the terrible epidemic of yellow fever in that year postponed the opening. He took an active part in its organization, and in 1886 became professor of principles and practice of surgery and dean of the school, which positions he held until the merger of the college with the University of Tennessee.

Bidding her dying brother, Dr. W. H. Gragg, of Gragg Station, near the National Cemetery, good-bye, Mrs. L. A. Vaughan, an aged woman, left the room and dropped dead just fifteen minutes before her brother breathed his last. Dr. Gragg was for ten years superintendent of the Shelby County Poor and Insane Asylum. The cause of his death was pneumonia.

Dr. W. L. Duckworth died at his home in Haywood County, near Brownsville, February 2nd. He is survived by his widow, three sons and one daughter.

TEXAS.

At Austin, January 28th, Dr. W. B. Collins, recently appointed by the Governor as State Health Officer, and Dr. W. A. Davis, appointed State Registrar of Vital Statistics, took the oath of office and assumed their duties.

Dr. M. P. McElhannon, of Bell County, was appointed a member of the State Board of Medical Examiners. The other members of the board are: Dr. J. J. Williams, Limestone County; Dr. J. H. McLean, Tarrant County; Dr. John S. McCelvey, Bell County; Dr. S. L. Scothorn, Dallas County; Dr. H. C. Morrow, Travis County; Dr. T. J. Crow, Dallas County; Dr. M. A. Cooper, Childress County; Dr. M. F. Butencourt, Falls County; Dr. W. T. Swain, Dallas County; Dr. H. B. Mason, Bell County.

At Hillsboro, January 29th, Dr. Saylors, a druggist and practicing physician, killed a Mr. Joe Kirkpatrick in a pistol duel.

The Dallas County Medical Society has unanimously voted favoring a complete revision of the health and sanitary code of the city, and requesting candidates for the offices of mayor and city commissioners to announce their position upon this matter.

At Tyler, January 30th, several mild cases of smallpox were reported. All those infected were immediately quarantined.

At Lockhart, where the physicians have erected a surgical hospital, boxes have been placed at two prominent stores and the people are rapidly filling them with gifts of table and bed linens, towels and spreads.

The McClennan County Medical Society has voted to form a Medical Journal Club, the purpose of which will be to keep a stock of medical publications at the public library.

Dr. Charles Stevenson, one of the assistant physicians of the state asylum at Terrell, has moved to Houston.

At San Antonio, January 19th, during the absence of Dr. G. W. Douglas on a professional visit at an early hour, burglars quietly entered his home, and having gathered up a considerable quantity of silverware, piled it upon the floor while they looked for more plunder. Dr. Douglas returned and stumbled over the pile, and the noise scared the burglars so that they ran away.

The next meeting of the South Texas District Medical Association will be held at Victoria April 8-9.

The medical directors of the Texas life insurance companies have elected Dr. William M. Brumby President and Dr. M. M. Smith Secretary-Treasurer.

Dr. C. H. Brownlee, of Burnet, has been appointed state hookworm specialist and has moved to Austin to assume his duties.

The Panhandle District Medical Society has elected Dr. P. D. Frizzell, of Quanah, President, and Dr. J. J. Crume, of Amarillo, Secretary.

(Continued on page xxvi.)

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3 Or that of any other person (not necessarily an assistant or agent)
4 All such claims arising in suits involving the collection of professional fees
5 All claims arising in autopsies, inquests and in the prescribing and handling of drugs and medicines.
6 Defense through the court of last resort and until all legal remedies are exhausted
7 Without limit as to amount expended.
8 You have a voice in the selection of local counsel.
9 If we lose, we pay to amount specified, in addition to the unlimited defense.
10 The only contract containing all the above features and which is protection per se. *A sample upon request.*

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Bran Breakfasts

Which Everybody Likes Let Us Send You Some

Your requirements in a bran food are these, are they not?

First, it must be efficient. That means it must be rich in bran, and the bran must be *unground.*

Second, it must be inviting. Clear bran in any form is rarely used for long. And your wish, usually, is to establish the bran habit.

Pettijohn's will meet your requirements better than any other bran food known. It is soft white wheat flaked much like Quaker Oats. It's a luscious food which appeals to every taste.

And it is one-fourth unground bran, so concealed that one hardly suspects it. Do you know anything else so ideal as a bran food?

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Package Free

We will mail to any physician a full-size package for testing at home or with patients. Please ask us for it.

Most better-class grocers sell Pettijohn's for 15 cents per package. It has national distribution, so any grocer can get it from his jobber. For free package address

The Quaker Oats Company
Chicago, Ill. (880)

(Continued from page xxiv.)

The Caldwell County Medical Society has elected the following officers: President, J. M. Watkins; Vice-President, Keeton Alexander; Secretary, Edgar Smith.

Dr. W. M. Shytles, of Johnson County, has been appointed to a place on the medical staff of the Terrell Insane Asylum.

The Guadalupe County Medical Society has elected the following officers: President, Dr. M. B. Anderson; Vice-President, Dr. M. B. Grace; Secretary-Treasurer, Dr. M. B. Brandenberger.

Deaths.

At Dallas, January 30th, Dr. Sampson Eagan died at his home, 3805 Bowser Street, from paralysis, aged 79 years.

At Terrell, January 30th, Dr. W. T. Childress died at his home, aged 91 years. The remains were sent to California for burial beside other members of the family in the cemetery of Los Angeles.

At Beeville, January 24th, Dr. D. M. Thurston died, aged 63 years.

At Mineral Wells, Dr. C. F. Yeager, for thirty-four years practicing physician at Mineral Wells, died, aged 67 years.

At St. Augustine, January 14th, Dr. Bascom Kavanaugh, who was shot thereon January 7th, in front of his home, died of his wounds.

At Hempstead, February 2nd, Dr. J. J. Perry, for thirty-seven years a resident of that town, died at the home of his son, Sheriff J. J. Perry. He held a hospital commission in the service of the Confederacy during the entire war.

At Fort Worth, January 16th, Dr. L. G. Bomb arger was found dead in his office. Death was caused by inhaling gas from a broken pipe, which he had evidently been trying to repair. He was a graduate of the Memphis Hospital College.

At Minneola, January 20th, Dr. J. E. Cooper died at his home of apoplexy.

At San Antonio, Dec. 28th, Dr. J. W. Carhart died at his home from heart disease, aged 80 years.

At Houston, November 9th, 1914, Dr. C. D. Warren died at his home from tuberculosis, aged 31 years.

VIRGINIA.

At Norfolk, Dr. Schenck, health commissioner, requires that all cooked food and other edibles exhibited and offered for sale in and around the market, delicatessens and grocery stores must be protected by glass cases, and that meats, poultry and game displayed outside of stores must be wrapped in white cheese cloth.

Dr. S. E. Hughes, of Danville, is in Asheville, N. C. He will spend two or three months in complete rest. Dr. J. E. Taylor will occupy his office and attend to his practice during his absence.

Several cases of supposed chickenpox which have appeared in parts of Culpepper, Rappahannock and Madison Counties, have proved to be mild cases of smallpox.

Dr. Allen W. Freeman, assistant State Health Commissioner, and J. H. Binford, Secretary of the Co-operative Education Association, have just completed an inspection tour of the public schools of Prince William County. Everywhere the patrons turned out in large numbers to hear their talks on sanitation and school work.

At Lynchburg, February 1st, thirty cases of chickenpox were reported. There were also two cases of mumps, one of whooping cough, two of diphtheria, three of measles and five of typhoid fever. The laboratory of the health department, after careful analysis, declared that the milk furnished to Lynchburg consumers had been watered and some of it was dirty.

At Norfolk seven dairymen have declined to take out permits to sell milk in the city because they sell all their products to one firm and do not distribute it.

At Blackwood, a mining town four miles from Norton, it was reported, January 27th, that epidemic cerebro-spinal meningitis was prevailing in a malignant form; that 20 deaths had occurred and several other cases were under treatment. Some of the cases died within twelve hours after being attacked.

At Richmond, early in January, seven members of Holy Trinity Episcopal Church were simultaneously attacked with typhoid fever shortly after partaking of a dinner served by the church. The chief health officer, Dr. Levy, said there was no reason to suspect that impure water was the cause of the outbreak. None of the seven patients were dangerously ill.

At Kinston, in January, every dairy cow supplying the town with milk was tested with tuberculin. Several of the animals were found to be infected and were promptly isolated.

The Dinwiddie County Medical Society has elected the following officers: President, Dr. E. W. Perkins; Vice-President, Dr. H. G. Leigh; Secretary, Dr. D. C. Mays; Treasurer, Dr. A. F. Bagby.

Deaths.

At Crozet, January 25th, Dr. A. B. Wayland died at his home after a long illness.

At Hamilton, January 24th, Dr. Thomas Keen died after a long illness. He was noted as a raiser of fine blooded race horses.

At Charlottsville, January 17th, Dr. Dabney M. Trice, Superintendent of the Moores Brook Sanitarium, located near Monticello, died after an illness of three days with pneumonia, aged 54 years.

At his home, "Red Hill," after a week's illness of pneumonia, Dr. D. B. Boston died, aged 82 years. He was unmarried.

At Richmond, January 15th, Dr. John F. Winn died at his home after a brief illness with pneumonia. His age was 63 years. He leaves a widow and two sons.

WEST VIRGINIA.

Frank W. Klein, recorder at Warwood, was directed in January by the city council to write to Dr. S. L. Jepson, State Health Officer, calling his attention to the unsanitary condition of the grounds in and around the Richland coal mining settlement.

At Martin's Ferry word has been received that one of the students at Mt. Union has been quarantined in his fraternity house for scarlet fever.

The people of Martin's Ferry have been notified to boil the drinking water as a considerable quan-

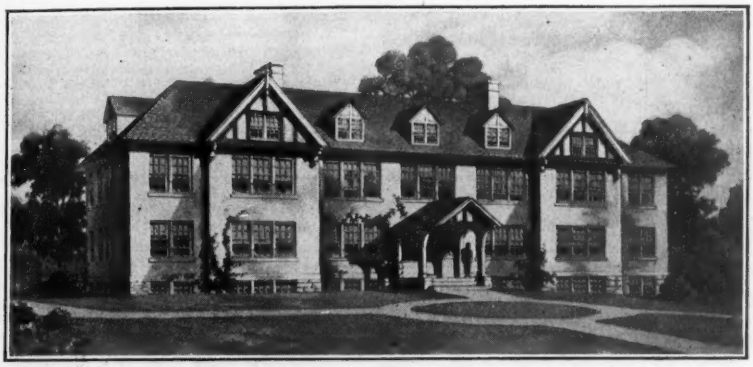
(Continued on page xxviii.)

Quality and Safety Assured

The Mulford Biologicals are Protected by Every Safeguard

The care taken in every step of the preparation, testing and finishing of the Mulford Biologicals safeguards their purity and activity. A special hollow tile and concrete laboratory, practically a fireproof monolith, is devoted to filtering, labeling and finishing the tested products. The building is divided into separate departments, each constituting a complete unit.

Operating Room.—The animals are bled in a special building erected and equipped with the same care as the operating room of a modern hospital. In a different group of rooms the serum is separated from the blood and placed immediately in special refrigerating rooms.



A Model Laboratory Devoted to Filling, Labeling and Finishing the Mulford Biological Products.

After the serum is subjected to careful and rigid physiologic and bacteriologic **tests,** and confirmed in duplicate by double and independent check tests, it is delivered to the antitoxin filling rooms.

Air Washing and Humidity Control.—The twenty filling and serum rooms are supplied with washed and filtered air, insuring aseptic conditions. Humidity and temperature are controlled, giving ideal working conditions for the employes.

Arrangements for Visitors.—Glass partitions between the halls and working rooms permit the demonstration of the work to visitors.

THE UNIT SYSTEM.—The Mulford Laboratories are arranged and managed throughout under the unit system. Separate buildings or departments are devoted to the preparation, standardization, packing and shipping of each product. Each unit is in charge of an expert in the particular branch. Special refrigerating rooms, supplied with cold air from a central plant, form an important part of each individual unit. This makes it possible to carry a large stock of biologicals without danger of deterioration, so that at all times the laboratories are prepared to meet the demands created by epidemics.

Containers.—The Mulford Antitoxin and Bacterin glass syringes, together with special apparatus employed in experimental work, are manufactured in the glass factory, located within the laboratory grounds.

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New York Chicago St. Louis Atlanta New Orleans Kansas City Minneapolis San Francisco Seattle
Toronto, Canada London, England Mexico City Melbourne, Australia

(Continued from page xxvi.)

tity of river water is being pumped into the main because of a break in the line at the pumping station.

The officers for the State Medical Association are as follows: President, Dr. R. E. Venning, Charlestown; President-elect, Dr. H. P. Linsz, Wheeling; Vice-Presidents: First, Dr. J. B. Kirk; Second, Dr. T. K. Oates; Third, Dr. I. N. Houston; Secretary-elect, Dr. J. H. Anderson, Mary Town; Treasurer, Dr. H. G. Nicholson, Charleston.

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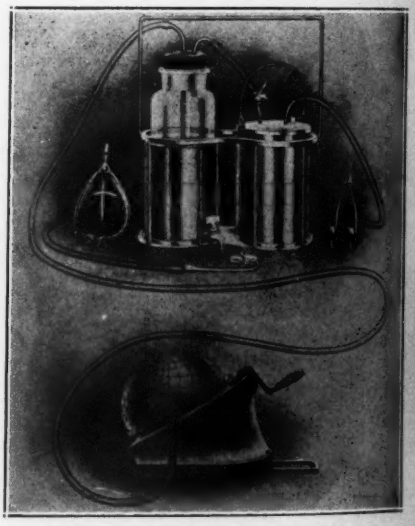

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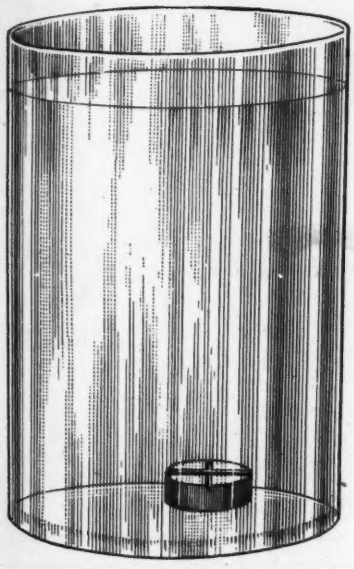
PTOMAINE POISON



Where the patient is suffering agony from ptomaine poisoning as a result of tainted food, place

ONE TABLET OF

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in one tumbler warm water.

Let the patient drink entire tumblerful.

It has many times been shown that this procedure counteracts the influence of the ptomaines and brings relief most promptly. Many patients now dead, might have been saved had physicians all known this valuable truth.

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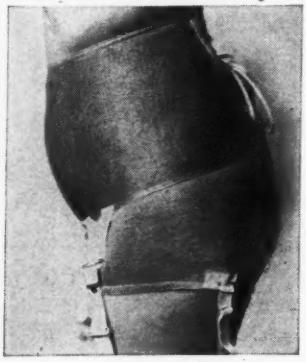
Made to measure—not a stock affair.



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Take snug measurements over the skin.

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BACILLUS (Metchnikoff) B. / INFANT CULTURE

Prepared under the direction and scientific patronage of Professor Metchnikoff and containing the strain of the bacillus Bulgaricus selected, studied and recommended by him for administration in medical practice.

This is the most effective form for the treatment of all intestinal ailments of bacterial origin in nursing infants and young children—infantile diarrheas, enteritis, marasmus, malnutrition, etc. The culture medium utilized in this preparation does not contain anything not found in the natural pabulum of a nursing infant.

THE USE OF THIS INFANT CULTURE RELIEVES THE PHYSICIAN OF ADMINISTERING TO A SICK NURSING INFANT A MEAT BOUILLON FOR THE FIRST TIME IN ITS LIFE

NO PEPTONE OR MEAT INGREDIENT IS USED *in the* MEDIUM *for* INFANT CULTURE

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The scientist whose researches and writings are being constantly quoted as the leading authority for the use of the bacillus Bulgaricus in medical practice is our scientific sponsor and personally stands as a guarantor to you of the Bacteriological Integrity of our work. This laboratory prepares for your use in practice only such pure and viable cultures as Professor METCHNIKOFF would use personally.

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THE PROCESS—Full-ripe grapes, freshly pickt, stemmed,—juice quickly sealed in new bottles. It is not diluted, boiled or concentrated; is without chemicals or preservatives; no sugar is added. The Welch process saves the delicate fruit flavor and all the tonic and food properties.

This Grape Juice is a food—a nutritious fluid for both sick and well. It is palatable, appetizing and strengthening—can be taken when other foods are rejected.

As a beverage dilute with chipt ice. For the Sacrament, to each quart add one or two tumblers of water.

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When opened it will keep sweet for a time in a cool place. Serve cold.

Specify *"WELCHS"* when ordering and avoid disappointment.

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It's nature's own drink and satisfies that craving for something refreshing and invigorating. Welch's is the pure juice of the choicest selected Concord grapes. Nothing is added. It is always pleasing to your patients, and gives your convalescents a lift along the road to recovery.

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Sodium Glycerophosphate 1 gr.
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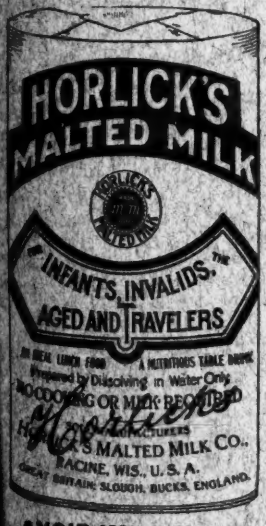

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